The Builder.

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Timber-work in West Somerset.

IT is a mere commonplace in the study of either ecclesiastical or domestic architecture of the old days to note that its style and development depended to a very large extent on the nature of the material that was most accessible. With the superior means of locomotion that have been for so long a time available, the difficulties that beset the workers and the craftsmen of mediæval days have almost entirely disappeared. But when the transit of heavy material, otherwise than by water-carriage, was so exceedingly costly, and sometimes almost impossible, we can readily realise that the art of building anything more elaborate than mere shelters was to a vast extent dependent upon geological conditions. It is of particular interest to note that the more beautiful developments of English wood-carving and screen-work are to be found in such counties as Norfolk and Suffolk, where stone is almost entirely absent, or in those parts of the west of England or on the borders of Wales where, though stone may be abundant, it is not tractable for any decorative purpose.

Nowhere is this more noticeable than in that beautiful district of West Somerset, which includes the interesting small towns of Dunster, Minehead, and Porlock. Here stone near to the surface and singularly accessible prevails in all directions. It is of a character, without going into any geological niceties, that lends itself readily to walling and general masonic purposes; but it is found impossible to use it in any way where mouldings or sculptures are required. It has, indeed, quite recently been found that good workable stone exists in some parts at a considerable depth, as in the Doverhay quarry at Porlock. But this fact was not known in mediæval days, and its use even now is almost prohibitive owing to the costliness of working at such a depth.

Throughout the XVth century, and to some extent at earlier dates, when good stone was required for the churchyard crosses that are found in every old burial-ground of the district, or for fonts, or for the doorways, window-frames, mullions, tracery, or battlements of churches, the nearest place where such material could be found was the famous but far-distant quarry of Ham Hill. A close study of the church fabrics shows that from time to time stone was also carried here from different parts by water-carriage in the Bristol Channel. The tedious and costly process of bringing hither blocks of Ham Hill stone by pack-horse (for wheel-roads of any kind were almost unknown in the wilder parts) caused the local builders to look elsewhere for some workable substance which would be suitable for door and window frames.

Although, as is now generally well known, the term Exmoor "Forest" (like the forests of Dartmoor or the High Peak) does not in the least imply a great stretch of woodland, but merely a waste district reserved for royal sport—the confines of Exmoor, and more especially the beautiful combes that run down into Porlock Bay, were richly clothed with oak from the earliest historic times. Hence it came about that oak was largely used for building purposes in the directions indicated. There is an entire absence in this neighbourhood of the fine half-timbered buildings for which Cheshire, Hereford, Shropshire, and other parts are so justly celebrated, for the ordinary walling of uneven stone could be so easily accomplished. Within the last half-century a great deal of interesting woodwork has disappeared in West Somersetshire owing to the unfortunate removal of the older style of buildings both in cottage and farmstead. Nevertheless there is much of great interest and exceptional style still extant, which has not hitherto received the attention it deserves from either lovers of the picturesque or architectural students.

Essex, as well as parts of Surrey and Hampshire, shows much more that is noteworthy in the way of ecclesiastical timber-building than is the case in West Somersetshire. Putting aside, however, the exquisite canopied rood-screens which still remain at Dunster, Minehead, Timberscombe, Withycombe, and Carhampton, as well as the famous and elaborately carved bench-ends of the churches of the Quantock district, several unusual wooden details still remain in the church fabrics. At Stoke Pero, a most out-of-the-way little village in the wilds of Exmoor, amid the highest slopes of

Dunkery, the somewhat primitive though restored church has the pointed door-frame formed of two solid blocks of oak slightly chamfered. There can be little or no doubt that this was placed here in the XIVth century. In the church of Minehead one of the several noticeable features is the rude arch formed of stout, roughly-hewn timber which leads into a north-east chapel, now used as a vestry, out of the north aisle of the chancel. This part of the church is of the time of Henry VIII. On the outside of the wall, above the east window is a black-letter inscription in stone to the following effect :—

"We prey to Ihu and Mary
send our neyburs safte."

This distich seems to corroborate the idea that the chapel was built by a guild of fishermen.

The romantically-situated tiny church of Culbone, which can make good its claim to be the smallest perfect parish church in England, is brimful of interest from early Saxon days downwards. It underwent considerable alterations in the latter half of the XVth century in which woodwork predominated. A sturdy, simply-carved chancel screen still remains, and the bosses and wall-plates of the old cradle roof of the nave are good of their kind. One of these bosses is of distinct interest to those who study English tree culture. It bears, arranged as a saltire cross, four faithful representations of Spanish chestnut leaves. These trees are now flourishing in the Culbone woods, and the carving on this boss points to the fact that they were almost certainly flourishing here in the XVth century. But for our present purpose it must suffice to draw attention to the two-light square-headed windows on the north side of the nave (Fig. 1). The mullions, the cinque-

Fig. 1.

foil heads of each light, as well as the hood mould, are of oak, and in almost as good condition as when first cut by the carpenter. On the south side of the nave is an almost exact facsimile of this window in Ham Hill stone. So far as we are aware this is the only oak-framed window left in these churches ; but they have disappeared within the recollection of not a few now living from at least three other parish churches, owing to the march of heedless restoration, which, alas, too often does its best to blot out the story of the past.

When we come to domestic buildings, these timber remains are far more frequent, particularly in doorways. One or two are still to be noted at Minehead, though very much that was ancient has disappeared in the last few years from this old mediæval borough before the steady advance of the tourist wave. At Selworthy, though the delightfully picturesque detached almshouses on the Green are of last century's date, there are several pre-Reformation oak doorways to be noted among the older cottages. The same is true of the hamlet of Allerford, and pre-eminently of Bossington, whilst they are also to be noted in Porlock,

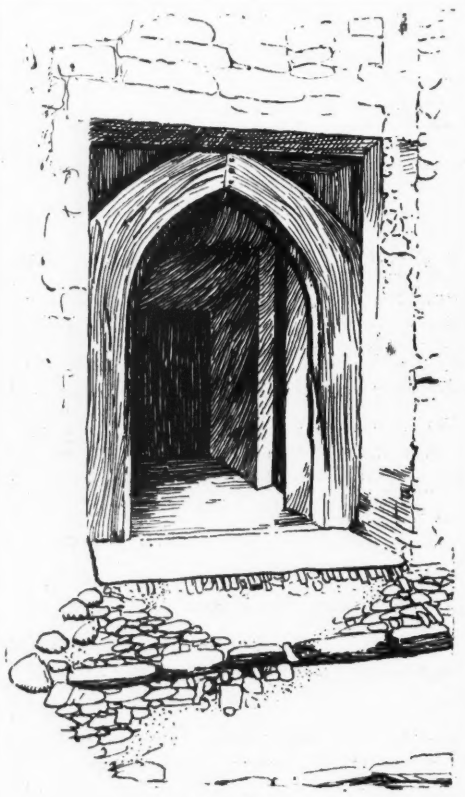


Fig. 2.

West Porlock, and Porlock Weir. We give drawings of two examples of these massive timber entrances. The first of these (Fig. 2) is from Bossington. Its pointed form in general appearance is suggestive of the XIVth century, and it is quite obviously of earlier date than the later squared framework in which it has been inserted. The other doorway here depicted (Fig. 3) is that of a substantial house, facing the sea, on the left-hand side as Porlock Weir is entered. It is about the best example of a late XVth or early XVIth century doorway of the numerous instances in this district. In Porlock itself, close to the quaint old church with its truncated spire, the timbered doorway and window-frames of a small house which used to serve as a residence for the chantry priest are well worthy of observation.

Five or six other places might be mentioned where such doorways are to be found, and there is a particular wealth of old timberwork in cottage and farmstead at the hamlet of Tivington, between Selworthy and Wootton Courtenay. But the only one that remains for special

Fig. 3.

mention on this occasion is the small wooden doorway to the old circular dovecot of the monks of Dunster, which now stands in the Vicarage garden. Of this a drawing is given (Fig. 4), and we have no hesitation in saying that the

Fig. 4.

doorway as well as the stone fabric of this interesting dovecot are of XIIIth century date. A few miles distant from Dunster, in the hamlet of Blackford in Selworthy parish, there is a yet more

interesting and more ancient circular dovecot still standing in fairly good condition, capped with its original stone roof. The doorway on the ground floor has of comparatively late years been enlarged and recased to admit of its being used as a cider cellar. But, up to the "fifties" of last century, the small doorway had a semicircular head of timber. The structure itself is of XIIth century date, and it is very probable that the removal of this doorway effected the destruction of the only known timber entrance of that century of the whole of England.

Throughout this district the number of oak-framed mullioned windows of XVIth and XVIIth century dates is very numerous, and far in excess of the doorways, particularly if we also take into account those of the XVIIth century. They can be found in almost all the small towns, villages, and hamlets of this part of West Somerset. By far the most interesting and elaborate examples of such windowed timberwork in which tracery is introduced are to be found at Bratton Court, about a mile from Minehead, on the old but little used direct road to Selworthy. This was in all probability the birthplace and home of the great XIIIth century lawyer and justice, Henry de Bracton. The entrance to this court, now used as a superior farmstead, is under an archway with a huge open framework which carries a pair of massive doors. Above it is a little room reached by a narrow stone staircase, which, according to the ordinary run of guide-book lore, was Bracton's study; but the whole of the details, including the oak frames of the small windows, are at least two centuries later than the days of the great lawyer. Much of the building in the square of the courtyard is ancient. These buildings deserve far more attention than has yet been given to them, and it would well repay any architect of mediæval tastes to thoroughly plan out the whole building, giving measured drawings. We give a drawing of the traceried oak framework of one of the windows (Fig. 5), which is

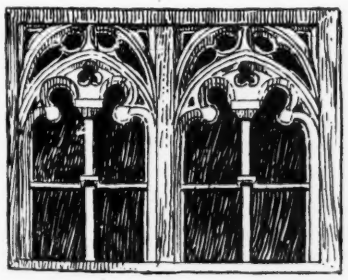


Fig. 5.

of more elaborate character than any we know elsewhere. It is difficult to dogmatise as to the date of this elaborate wood-carving, but we are inclined to think that it may be as early as the reign of Richard II.

There are a few instances remaining in which these square-headed domestic windows have cinquefoil heads to the lights. One of these may be noted in the street of Porlock close to the Ship Inn, at the foot of the great hill to Lynton. Perhaps, however, the most interesting place in which such work occurs is in the centre of the old part of the town of Minehead. On the left-hand side of the main street going down to the sea stands a quaint and delightful old block of buildings, not as yet much spoilt, and used conjointly as manorial offices and as a furniture warehouse. The massive walls are strongly and in some places awkwardly buttressed. Some of the older buttresses and other features point to the fact that the main portion of the fabric is of XIIIth century date; but it was much altered and adapted to later domestic use in the XVth or early XVIth

Fig. 6.

century. The story of the building has not as yet been unravelled. The whole of it would form a delightful subject for a thorough architectural study. A drawing is here given (Fig. 6) of the gable end facing the street.

A NEW MODELLING SCHOOL.—Miss Esther Moore, pupil of Professor Lantéri, and well known as an accomplished sculptor and exhibitor at the Royal Academy and the New Gallery, has opened a school for modelling at 4, Gainsborough-road, Bedford Park, where she intends holding classes daily for modelling and drawing, with life classes three days a week. A special study is also to be made of practical design for metal work, electric lamps, jewellery, etc.

SOCIETY OF ARTS: THE "STOCK" PRIZE.—The Council of the Society of Arts are prepared to offer, under the terms of the Stock Trust, a gold medal, or a prize of 20*l.* for competition amongst the students of the schools of art of the United Kingdom, at the annual competition to be held in 1908. The prize is offered for the best original designs for an architectural decoration, to be carried out in painting, stucco, carving, mosaic, or any other process. Further particulars can be obtained from the Secretary, Society of Arts, John-street, Adelphi, W.C.

NOTES.

St. Paul's Cathedral.

ACCORDING to the interim report of the committee appointed to inquire into the stability of St. Paul's Cathedral, the construction of the proposed sewer would be a probable source of danger to the building. The committee in question consists of three eminent architects (in addition to Mr. Macartney, the architect to the fabric), who are undoubtedly qualified to speak with authority on matters belonging to the artistic and practical features of building construction, but cannot be regarded as experts in such special engineering work as tunnelling. For our own part we cannot see the least reason for anticipating danger. As designed, the sewer will be entirely in the London clay, 60 ft. deeper than and some distance horizontally from the foundations of the cathedral; it will have a cast-iron lining built up in segments as fast as the work of tunnelling is executed, and the very small clearance between the exterior of the lining and the cylindrical hole in the clay will be filled with cement grout injected under pressure. Humanly speaking, it is impossible for work so executed in London clay to cause any disturbance of the ground above. Some of the cracks in the Cathedral are certainly due to settlements which took place centuries ago, and it is not improbable that these cracks may have opened wider and that others may have developed owing to the drainage of water from the gravel beneath part of the south side of St. Paul's. By building a watertight wall extending down to the clay so as to enclose the gravel-supported foundations, the authorities could prevent any future subsidence from taking place owing to changes of water level in the permeable stratum. This suggestion, of course, has nothing to do with the case of the proposed sewer.

The Water Supply of London.

TWO NEW storage reservoirs which have been constructed by the Metropolitan Water Board at Walton-on-Thames were opened on Saturday last. Their total capacity is about twelve hundred million gallons, and their water area about 125 acres. They have been constructed under powers given by the Southwark and Vauxhall Act, 1898, and the same Act gave the late company the right to abstract from the River Thames an additional average quantity of twenty and a half million gallons daily, with a maximum of one hundred million gallons in any one day, subject to a minimum rate of flow being maintained at Penton Hook. At the average rate of supply the reservoirs will take sixty days to fill, but nothing is said in the published account of the proceedings on Saturday as to the number of days' supply which the new reservoirs will hold. The main object of the reservoirs is to improve the quality of the water by efficient subsidence before the water is passed on to the filter beds, and there can be no doubt that the reservoirs will be an additional safeguard against the communication of water-borne disease. At the same time it does seem strange that

the principal city of the Empire should still be drawing its water for domestic supplies from rivers contaminated with the sewage of a number of large and small towns.

Preserving Stonework. A LECTURE upon "The Conservation of Historic Buildings and Frescoes" was given last week by Professor Church at the Royal Institution. Professor Church has studied the subject of the preservation of decaying stone for many years past, and has carried out important preservation work at Westminster Abbey and elsewhere. The process he has found most effective in the case of calcareous stone which has been exposed to the action of the sulphur acids contained in coal smoke consists in spraying the stone with a saturated solution of barium hydrate. The solution penetrates into the stone to a depth of several inches and after it had been applied a considerable number of times it makes the stone harder and denser than when in its best natural condition. When the barium hydrate comes in contact with sulphate of lime it is converted into sulphate of barium, which is practically insoluble in water. The lime is converted into carbonate of lime by absorption of atmospheric carbon dioxide. Professor Church also advocates treatment of the surface of the stone, where possible, with ceresin wax. This gives the stone a waterproof surface, and, in the case of painted walls, gives the stone a suitable surface for taking fresh touches of colour. We agree that the application of limewash to decaying stone, which has been recommended by some architects, is almost useless.

The National Physical Laboratory. IN their annual report submitted last month the executive committee and the director of the National Physical Laboratory record numerous results of a satisfactory year's work. The main research in the Engineering Department was a continuation of the inquiry into the effect of wind pressure on structures, the general conclusion being that the mean pressure per unit area was invariably about 18 per cent. greater when measured on the large model than when determined by observations on similar models of smaller size. Hence it is recommended that the average wind pressure on a large and complicated structure may be ascertained with substantial accuracy by finding the pressure on a small model and increasing it by 20 per cent. In the same department a large number of tests has been made upon materials under alternating bending stresses due to repeated impact. It is reassuring to find a confirmation of the generally accepted view that so long as the range of stress does not exceed the natural elastic limit of the material, an unlimited number of alternations of stress will not cause fracture. Various other departments have been busy with research work of important character, and in the metallurgical division Dr. Carpenter and Mr. Edwards have completed a monumental task, represented by the eighth Report of the Alloys Research Committee of the Institution of Mechanical Engineers. The somewhat controversial question of commercial testing hitherto undertaken is now under the consideration of a committee appointed by the Board of Trade, and in due course we may expect to hear whether the laboratory will be permitted to continue work of this kind for which so many facilities are afforded in other countries by State-supported institutions. In Great Britain there seems to be a strong feeling in some quarters against anything of the kind—an objection which, if sustained, will not tend towards the continued improvement of British manufactures.

The Railway Rebate Question. A PARLIAMENTARY paper issued last week serves to confirm our impression as to the purpose and scope of the agreement arrived at between the Companies on this subject, which, it will be remembered, created something of a scare in trading circles in January last. Certain provisions of the arrangement which had leaked out conjured up visions of another great "combine," working to the disadvantage of the public; and we have now the official version of the agreement as furnished, by request, to the Board of Trade. The Companies state that it only aims at the abolition of rebates of a secret nature which have been allowed to traders by certain agents out of the commissions received by them from the companies. "Its effect is not to raise rates," remarks the document reassuringly; and this must be regarded as literally accurate, even in the case of the former recipients of these allowances, who will find that their freight expenses are raised if the rates are not, and whose resentment is perfectly natural. The Companies point out that the practices attacked enabled certain traders to obtain preferential treatment, and were in other ways opposed to the public interest. For a trading body to pose as public benefactors is a sure way of provoking suspicion; but though we may, therefore, possibly not have heard the last of this matter, we see no reason for modifying our opinion that it mainly concerns the railway companies themselves, and that it conceals no sinister design upon the trading community.

The Powers of Corporations. THE decision of the Court of Appeal in the case of The King *v.* The Mayor, etc., of Brighton will be viewed by many persons with a feeling of regret. We commented on this case when it was decided by the Divisional Court (see our Note, May 12, 1906), and it will be remembered that it involved the question whether the Brighton Corporation had acted within their powers in expending some 3,000*l.* in relaying the Madeira-road with tarmac. The Divisional Court held that this expenditure had not been incurred in the interest of the road, but with a view to getting the Automobile Club to hold its motor-car races there, and the expenditure was disallowed. The Court of Appeal has reversed this finding on the ground that the improvement of the road was a matter within the discretion of the Corporation, and that it was an improvement carried out for the benefit of the people of Brighton and not for the Automobile Club, and that the Corporation had not acted *ultra vires*. It is a significant fact that for some of the four days during which the races were held the public—that is the ratepayers who are now liable for this sum—were excluded from the road, according to the report of the case in the *Times*. We presume this means that they were excluded unless some payment for tickets was made. The legality of this action on the part of the Corporation, we apprehend, could not be raised in the proceedings taken in this case, which were confined to the question whether or not the expenditure had been justifiably incurred in carrying out powers conferred by the Public Health Acts on the Corporation.

The Private Street Works Act, 1892. IN the case of Pearce *v.* Maidenhead Corporation a point of some importance under the Private Street Works Act, 1892, has recently been decided. Under sect. 7 of the Act a frontager who was charged under the specifications and plans and by the provisional apportionment proposed by the local authorities for certain works on the street gave notice of objection, and under sect. 8 of the Act a hearing took place as to these objections before the justices, who upheld the plans and provisional apportionment. The frontager then applied to Quarter Sessions, which tribunal allowed the objections, subject to the decision of the legal point whether the appeal could be brought at all, the local authority having contended that the decision of the justices was final. The Divisional Court has decided that this Act, by virtue of sect. 1, has to be construed with the Public Health Acts, and that under sect. 269 of the Public Health Act, 1875, an appeal lies on such a matter to the Quarter Sessions. Having regard to the serious expenses incurred in street improvement by local authorities and the heavy charges often in consequence imposed on householders, it is of importance that they should not be restricted to the decision of a local bench of justices, and therefore this decision is one of considerable interest. The decision by the Court of Quarter Sessions can also be carried to a higher tribunal if the Court thinks fit to state a case.

Steam Traps. IN one way or another architects are largely interested in steam traps for the automatic removal of condensation water from steam-pipes, water-heaters, air-heaters, cooking apparatus, and other essentials to modern buildings. For this reason we may usefully call attention to the carefully-written paper read a week or two back by Mr. Gordon Stewart before the Civil and Mechanical Engineers' Society. Having discussed the primary functions of steam traps in general, the author deals in turn with the merits and demerits of various types of such appliances without showing partiality or attempting to prove that any one trap is the best. The fact is that the purpose to which the trap is to be applied must very frequently be taken into account before any decision can be made by the intending user.

The Carshalton Tramway Accident. IN coming to the conclusion that excessive speed in rounding a 45-ft. radius curve was the cause of the fatal accident

between Carshalton and Sutton, the coroner's jury were undoubtedly right. We do not see satisfactory reasons for their decision that the brakes were not acting properly, if by that expression the jury meant to convey the idea that the brakes were out of order. The evidence rather supports the theory that the driver put on the brakes too hard, and so defeated his own object by causing the wheels to skid. That is just what a man is very likely to do on the spur of the moment when suddenly realising that he is approaching a sharp curve at excessive speed. The coroner dissented strongly from the rider of the jury to the effect that "the driver had not sufficient experience of the route and should not have been sent out by the company." But it must be remembered that the driver himself said that although he had held a driver's licence for a year, he had been employed in the depôt as a brake-fitter, and took the car out on Easter Monday as "an extra driver." While not in so good a position as the coroner to form a reliable opinion, we cannot help thinking that the jury had some reason for their conclusion as to the unfamiliarity of the driver with the route. The lesson of this accident is that tramway cars ought to be fitted with an automatic system of control capable of preventing the car from attaining excessive speed, thus providing a safeguard which does not exist in cases where reliance is placed solely on brakes that can be rendered practically inoperative in the hands of a nervous or inexperienced driver.

St. Olave's, Hart-street, E.C., and the Churchyard.

DR. TRISTRAM, K.C., has agreed to issue from the Consistory Court a faculty in respect of the "little old churchyard" in Seething-lane. The faculty authorises the sale to the Corporation of the City, at a price of 199*l.* 19s., of a strip of the ground for the widening on the east side of Seething-lane at the corner south of Crutched Friars. The ground, lying apart from the churchyard, which is on the west side of Seething-lane, was taken and consecrated in or about 1680 by reason of the numerous burials which had been made in the latter at the time of the Plague. Some doubt exists whether the "little old churchyard" was used for interments. The learned Chancellor said he was satisfied that it has not been used during a long time past, and that, failing any entries in the parish registers, the presumption is that it had been used—if used at all—only during the pestilence. Three years ago the fire-engine house was set back in the ground and a dwarf wall was built. The church, of which the rebuilding was begun *temp.* Henry IV., has a very early foundation, as the name testifies, being one of the four, and two of them remain in London, of which the dedication commemorates the help which the Norwegian King Olaf, or Olaus, rendered to Ethelred II. and the citizens in repelling the Danes. It presents many interesting architectural features, and contains several old monuments, and is memorable for its frequent mention by Pepys, who was, with his wife and brother, buried in a vault beneath the nave. The fabric escaped from the Great Fire. It was repaired and beautified by John Bull Gardiner in 1823, and by Ewan Christian in 1892; Sir Arthur Blomfield rearranged the interior, and designed the Pepys memorial. West and Toms's rare view of 1736 shows the tower with battlements instead of the later blocked parapet, and the outside staircase giving access to the pew or little gallery in the south aisle appropriated to the Navy Office. The oaken ceiling, partly renewed in 1633, is thickly studded with small stars over the aisles; the reredos is by Sir G. G. Scott.

"Saturday Afternoon" at Christie's.

OWING to the altered conditions of business and social life in the town, whereby the last day of the week is gradually becoming more devoted to relaxation and diversion away from London, the time-honoured sales of pictures at Christie's Rooms on Saturday afternoons during the season will be discontinued after the end of the first week in May next. The "Saturday afternoon" sales were originally adopted by James Christie, whose first auction-room for the sale of books was in Wardour-street. Retiring in 1794 he was succeeded in Pall Mall, at No. 125, next to old Schomberg House, by his son James, who died in 1831. James, the son, observed his father's custom in that respect in the rooms in King-street, St. James's, to which, with his sons James Stirling and George Henry, he had removed from Pall Mall in 1823. At No. 8, King-street, the first James Christie had frequently held sales in what was then Wilson's "European Emporium"; his first sale in Pall Mall was conducted on December 5, 1766, in Dalton's print-room. The premises in King-street have been enlarged by the addition of the new large room and octagon gallery, after Mr. W. H. Crossland's designs, and the rebuilding of the front, with entrance-hall for statuary, and staircase of which Mr. J. MacVicar Anderson was the architect, the plans embracing new offices and a scheme for future extension.

The late Mr. Hook.

THE death of Mr. J. C. Hook, at an advanced age and after a long and well-filled artistic life, removes from among us one of the most gifted artists in a class of subject in which, as is fitting for an island country, England is at present superior to any other country in the world, viz.; sea painting. Mr. Hook had long ago found his own treatment of the sea; he had got the secret of the colour and the movement of sea-water; there was a real salt-sea savour about his pictures. It might be said that he confined himself mainly to one aspect of the sea; but in fact the sea is so infinitely various in its aspects, and so difficult of treatment in nearly all of them, that it seems almost enough for one painter to have mastered one aspect of it. Mr. Hook could paint inland and river scenery very beautifully too—everyone will remember "Brimming Holland"—but it is as a sea painter that he was chiefly known and will be chiefly remembered. His vigorous personality has been preserved for us in one of the finest portraits that his friend Millais ever painted.

The late Mr. Skipworth.

MANY of our readers will sympathise in our expression of sincere regret on learning of the sudden and unexpected death, at an early age, of so gifted an architect as Mr. Skipworth, just at a time, too, when he had the prospect opening out to him of a larger professional success than he hitherto enjoyed. For though his fine and original designs for churches and church decoration had been seen often on the walls of the Royal Academy and illustrated in our own plates (where in fact almost every important design that he made has appeared), he had not hitherto gained so much practical recognition as his artistic genius deserved. His style of design was too original and too delicate and refined to appeal much to the average church committee, and he was by nature the last kind of man to put himself forward or assist his own interests. But he was a true artist in architecture, whose early death is a great loss. The news came as a specially painful shock to us, inasmuch as it is only two or three weeks since the editor of this journal, in a limited church competition in which he acted as assessor, had selected for execution the design submitted by Mr. Skipworth.

THE SOCIETY OF PAINTERS IN WATER-COLOURS.

WE have seen better exhibitions of the Water-colour Society than the one which opened this week, though to say that is not to imply that it is not an excellent exhibition. But some of the best contributors are hardly at their best this year. Mr. E. R. Hughes's "Heart of Snow" (62), which occupies the central position at the top of the room, is unsatisfactory in idea; it represents a mythical maiden in light drapery half-reclined on the snow at the edge of an Alpine *crevasse*; the girl is rather too real to pass as a spirit or an allegory, and consequently the predominating impression produced is—How very cold she must be. The nude portions of the figure are painted with the beauty and finish of modelling and execution in which Mr. Hughes never fails. Mr. Anning Bell's group of a Venus and her maidens expectant in an alcove, under the title "Where Tarries Adonis?" (25), is fine in colour and composition, but unsatisfactory in conception; there is no such classic dignity about it as should belong to a legend of the Gods of Greece. We may add that the bushy tree standing up in the middle distance outside, from its shape and colour, produces at first sight the unfortunate idea of being another woman's head turned from the spectator and with only the hair seen.

On the other hand, Mrs. Stanhope Forbes, who made sad work the last year or two of trying to illustrate Herrick, has found a much more congenial subject in the Pied Piper and the procession of children (216: the Piper is not "pied," by the way), the best thing this artist has done, and perhaps the best illustration we have seen of the subject, because the supernatural is realised in it; the over-wrought and unnatural excitement of the children, and the malice of the Piper striding before them and glancing back to see the result, are realised as we have never seen them realised before in painting; most "Pied Piper" pictures are only like stage representations; this is a piece of real *diablerie*. Miss Fortescue-Brickdale's "Romance" (140) is a fine piece of imaginative work, a winged figure in warm light singing and playing to listening figures, one of them a knight in armour; a landscape background somewhat after the manner of Titian completes a picture which would be well worth working out on a large scale as a decoration in a public hall. We hope that Miss Brickdale may sooner or later obtain such a commission, for which her genius is eminently fitted; in France such an artist

would have been certain to have obtained one before now. It is sad to find on the walls of the same exhibition such pieces of utter vulgarity as "I Showed Her the Ring" and "A Mistletoe Bough"; the execution is all right, of course, but we should think the finer spirits in the Society must regret that they ever gave the author of these a right to their wall-space. Among other pictures in which figures predominate is Mr. Walter West's carefully studied scene at a Quakers' Meeting (100), thorough in execution, and pervaded by a quiet sense of humour, even a touch of pathos in the fine profile of the old lady on the left. The recently elected Dutch member, Mr. Vosper, again shows something of the quality of a modern Ostade in his "Food for the Pigs" (34), a quite remarkable little piece of colour and composition, which we prefer to his larger drawing, "An Old Breton Beggar" (56). Mr. Sullivan's large drawing of a lady with a parrot, under the title "Popinjay" (30), clever as it is, repels one by a certain dinginess of colour, and the lady's face only stands out from the wall behind in virtue of difference of texture, being nearly the same colour. In Mr. Dollman's "Pixie-led" (66) the country girl is very sweet and innocent-looking, and the composition, in which the figures are half lost amid the indications of marsh vegetation, is very effective, leaving as it does a little to the imagination. His larger work, "The Raiders" (119), impresses us rather as a good stage scene of "hardy Norsemen" than as historic reality. Mr. Cowper, in his picture of Chaucer's "Merciles Beauté" (9), leaves nothing to the imagination, and the lady is somewhat too crudely rubicund even for a Chaucer character, nor is the picture attractive. Mr. Weguelin's "The Nymph's Garland" (12), in which a nude figure sits with her back to the spectator on the side of a hill overlooking the sea, is one of the best things he has done; we never like his cold colour in figure-painting (perhaps conventionalised intentionally), but the picture composes well, and there is a good sky. Mr. Bulleid, in his very matter-of-fact way of painting antique subjects, of which we are rather tired, has made a success nevertheless in the figure of the beautiful and clean-limbed Greek girl relieved against the marble of the bath-room (165); it is hard in style, but there is certainly corporeal if not spiritual beauty in it. Miss Rose Barton shows her usual charming and sympathetic treatment of childhood in "A Peri" (124), a little child looking in through a closed garden gate. Then there is Mr. Rackham, powerfully grotesque in "A Bargain with the Devil" (174), a book illustration; pathetic and satiric at the same time in his study of two monks in "The Monastery Garden"; and charming in his beautiful little drawing of "Children Returning from Fishing" (135).

The different principles on which landscape can be treated are curiously illustrated in this department of the exhibition. We have on the one hand Mr. Gregory's realistic and rather spotty treatment of foliage, as in "Now that April's there" (46), most conscientiously worked out in its way, and in which we could completely recognise a scene if we knew it; and Mr. Wilmot Pilsbury's less mannered but equally precise and realistic treatment of nature, so well done as to have a high interest of its kind, especially in the case of "Harvest Time" (58), one of the very best things this artist has produced. Then there is the entirely opposite principle, in which natural landscape is merely a theme for the painter to play his own variations on. As if to emphasise the contrast, next to Mr. Pilsbury's work just mentioned hangs Mr. Little's landscape, "The Golden Cap" (59), which from its title we presume represents the part of the Dorsetshire coast dominated by the seaside hill known locally as "Golden Cap"; but though we happen to have a special familiarity with that district, we certainly should not have recognised it here but for the title, and we do not think such colour as is prevalent in this fine and powerful drawing was ever seen in Dorsetshire. The case may be the same with Mr. Paterson's fine picture, "The Old Bridge at Stirling" (126), but then we do not happen to know the place, and so can take it merely as a picture, in which sense it is of exceptional interest, for it is a work in which the idea of pigment and mere handiwork is lost in the breadth of the style, and the clouds seem really to float in air. This is a work of marked individuality, in comparison with which one feels that the subjects by Mr. Thorne Waite, Mr. Allan's Scotch fishing harbours, and Mr. Marshall's London scenes, though all excellent in their fashion, are, practically, things that we have now seen a good many times, and in which the artists have to some extent got into a groove. Mr. Paterson may have a groove of his own, too, but it is a new one as yet. But after all said, the finest landscapes are those which, like the works of Mr. Eyre Walker and Mr. Colin B. Phillip, really represent nature, but nature which has not been reduced to a programme. Drawings like Mr. Eyre Walker's "Winter Sunshine" (116) and "Morning—Wales" (212) are the perfection of water-colour landscape painting, preserving the appearance of nature without losing her poetry. So is Mr. Phillip's "Mouth of the River Brittle, Isle of Skye—Rain Approaching" (63), where the hills on the other side of the water show that dark and almost threatening solidity which the Highland landscape puts on in bad weather. His "Lone Places of the Deer" (64) is also a grand Highland landscape. Among other works Mr. A. Goodwin has made a fine picture out of a part of the chalk precipice of Beachy Head, and shows us also a kind of dream vision of "Corfe Castle" (95) through a foreground veil of silvery gossamer trees; not real, but rather making one wish it were. Among other landscapes to be noted are a beautiful little work, "The Lark" (8), by Mr. Dollman, who does not generally come before us as a landscape painter; Mr. Louis Davis's "The Avenue" (97), a fine little decorative treatment of landscape; Mr. North's "The Furze Holt" (264); and Miss Butler's "Poppy Heads" (23), a small and beautiful little work which ought to have been hung lower; it is a foreground of poppies with masses of trees as a background—one can hardly say whether to class it as a decorative panel or a landscape, but it is a real work of art. In two larger drawings Miss Butler repeats her combination of peacocks and landscape with great effect, but it will be well not to make it a commonplace by repeating it too often. Among sea-pieces Mr. Hemy's "Broken Water" (36) is one of the finest and freshest things that he has exhibited at this Gallery.

The centre of Screen I. is occupied by a beautifully finished half-length, "Monna Giovanna" (234), by Mr. Hughes, and the centre of Screen III. by an interior with a single figure, "The London Farthing Post" (255), by Mr. Walter West, which, though not so important in size and subject as the picture of the Quakers' Meeting, is perhaps in colour and character his best work of the year. Mr. Reginald Barratt's architectural subjects are perfect of their kind, especially "Under the Library, Venice" (82), and "Palazzo Rezzonico, Venice" (211); Mr. Rooke contributes a large and fine drawing of the interior of St. Bartholomew's Church (192); and Mr. Sargent has a bold and rapid sketch of a "Fountain at Bologna" (177), which, for its vigour and the certainty with which each touch of the brush produces its effect, is in its way one of the most notable things in the exhibition.

THE EXHIBITION OF DANISH PICTURES AT THE GUILDHALL.

ONE sees so little of Danish art in London as a rule that the exhibition at the Guildhall rather comes as a surprise. It is true that there is nothing of the first order, and the larger pictures of important subjects, such as M. Bache's "Conspirators Riding from Finnerup," are rather commonplace; but among the smaller works there is a good deal to interest a visitor. Sea pictures and small interiors are the subjects in which the artists seem most successful; indeed, Professor Tuxen's large painting of a stormy sea, which he calls significantly "Appassionata," is a very fine work, and an exception among the larger pictures. Studies of fisher-folk, such as M. Ancher's "Will it Weather the Point?" ("will *she*," surely it ought to have been—who ever heard of a sailor calling a ship "it"?), and the smaller studies by M. Kröyer in Gallery III., are interesting and characteristic. M. Julius Paulsen, one of the more ambitious painters, shows us Adam and Eve by moonlight, just after the creation of Eve—an Eve of massive proportions and rather disappointing, and paints (Gallery III.) a nude "Nymph," also fat—fat and sad, though with fine colour; his little interiors "The Bedroom" and "Night," in Gallery III., are far more attractive than his nudes. So in another case; M. Irminger's "Wounded Lioness in the Roman Arena" and "Christian Martyr" *ibid.* do not affect us much, though the animal is a good repetition in painting of the well-known wounded lion in an Assyrian bas-relief; but his charming and sincerely expressed household idyll, "After Midnight" (Gallery IV.), is worth any amount of Roman arena scenes. The most individual and the most interesting, however, of all the modern painters is M. Hamershoi, whose name we confess we never heard before, but shall not forget now. With the exception of one very good and characteristic life-size portrait, his exhibited works consist of small interiors, sometimes with a figure, sometimes without, but always admirable in execution and in effect of light, and more or less poetically suggestive, even when there is no figure; the small picture called "The Open Doors," where we look through one open door to rooms with two others standing open at different angles, is quite remarkable for the degree of interest which he has contrived to impart to this simple subject; the collection of these interior subjects by him (there are fortunately a good many of them) is alone worth a visit to the exhibition. We should say that he was rather under the influence of De Hooghe, though he cannot be called a mere imitator. An older painter of small subjects, Eckersberg (now dead), is also worth special notice; he painted architectural subjects, chiefly Roman remains, exceedingly well; but after admiring these, we came on an admirable little sea-piece with a learnedly painted ship in the middle, and this was also Eckersberg, who handled marine subjects as well as he handled ancient architecture: the combination is certainly unusual. A large architectural painting by the late Professor Roed, "Interior of Ribe Cathedral," is an excellent piece of sound and learned architectural painting, interesting also from the architectural character of the interior; the columns and main arcade are of a brown masonry, most conscientiously drawn and jointed; above this the walls appear to have been plastered, except for the string-courses, shafts, and arch-mouldings, where the brown stone stands out strongly from the plaster surfaces, with a peculiar and not very satisfactory effect. Among the landscapes, which are not mostly very remarkable, is one by M. Pedersen, "Landscape—Evening" (Gallery II.), which attracted our attention not only as a fine work in itself, but for its striking resemblance to the character of the forest scenes of Diaz; it actually looks like Diaz on a rather larger scale than usual, and must certainly have been inspired by him.

The "Ecce Agnus Dei," otherwise an entombment, by Baron Rosenkrantz, has a fine quality of composition, and one is not surprised to learn that the painter studied under Benjamin-Constant and M. J. Paul Laurens: it is very like a Salon picture. M. Kröyer's large portrait group of "The Committee of French Artists for the Exhibition in Copenhagen in 1888" is a very good picture of its kind. The exhibition is, in an artistic sense, a very mixed one, and contains many things that are of little or no interest; but there is sufficient really good work to make it worth seeing.

HOME FOR THE BLIND, CASWELL, NEAR SWANSEA.—The Glynn Vivian Home of Rest for the Blind, which is now in course of erection, is situated between Langland and Caswell Bays. Accommodation will be provided in four rooms for seven women and a similar set of rooms for seven men, each sex having separate bath-rooms and lavatories. The domestic offices are situated to the north of the dining-hall and comprise china pantries, kitchen, etc., with wash-house, etc., in the yard. A sitting-room and a bedroom is provided for the superintendent. The roofs are to be covered with red tiles, the walls to be rough cast, and all gables having red tiles hanging to walls. The contract has been let to Mr. Henry Billings, and the work is being carried out from the designs and under the superintendence of Mr. Glendenning Moxham, architect, Swansea.

MAGAZINES AND REVIEWS.

THE *Art Journal* devotes a special article to the life and works of John Pettie, a painter who does not arouse much enthusiasm in us, except for his brilliant and really convincing representation of "A Sword and Dagger Fight" in the old days of bloodthirsty gallantry and rivalry—the best and most real thing Pettie ever did, an illustration of which suitably forms the headpiece to the chapter. The next best was "The Traitor" (also illustrated), a picture with something about it that reminds one strongly of some of Shakespeare's scenes among Elizabethan gentlemen, without illustrating any one of them in particular. These two pictures seem to us to stand apart among Pettie's works, which in general were rather commonplace both in idea and treatment. Among the smaller works "The Laird" was, however, a good revival of the Scottish life of the time which Stevenson delighted in, and it comes out well in a chromolithograph; there is more of landscape effect in it than Pettie usually indulged in. Mr. E. Avery Keddell writes an account with illustrations, of the house No. 25, Portland-place, under the inaccurate title "An Adams House"; "An Adam House" it should be. The interiors illustrated seem to show that it is, as the writer says, a typical example of the best work of Robert Adam, or of the brothers Adam, whichever way we choose to believe; but as it is on record that it was built as Robert Adam's own residence, there can be no doubt that it is his own special design.

In the *Burlington Magazine* a Mr. Clutton-Brock writes a paper or a communication on "The Modern House and the Modern Picture," apparently in reply to or in comment on something in a former issue of the magazine which we have forgotten. It appears that fewer pictures are purchased now, and that the assigned reason is that people like things that are "decorative" now; that modern pictures are not decorative, and therefore the money is spent on bric-à-brac, which is decorative. A picture, the writer thinks, though it cannot generally be designed for one particular room, "can be designed, like a good piece of china, so that it will be a reasonable ornament to a reasonable room." This is another specimen of the foolish cant of the present day, which regards a picture merely as "decoration." All we can say is that if a picture has not something more in it than decorative quality, it is hardly worth calling a picture. Painting is a great art of intellectual expression, not a form of decoration, but something on a completely higher level than decoration, or it is not worth doing at all.

The *Berliner Architekturwelt* is largely occupied with illustrations of a really remarkable building, the Weinhaus Rheingold in Berlin, of which Herr Bruno Schmitz is the architect. This appears to be an attempt to bring architectural poetry and fancy to bear upon the design and decorations of a restaurant *de luxe*. The exterior is neither very remarkable nor very attractive; but the variety and the strange and unexpected fancies of the interior treatment are almost bewildering. Sculpture of a curiously marked originality is employed in both exterior and interior decoration. One room, the "Onyx-Saal," of which a coloured plate is given, has the walls entirely lined with coloured marble, diversified with bas-relief sculpture panels of the Elements, the Four Seasons, etc.; of these some larger illustrations are given. Then there is the Blaue Kuppersaal—"The Blue Dome room," a circular room with a blue dome ceiling, and a white wooden gallery carried round it, supported on square posts that terminate in ideal heads of remarkable design and detail. There are restaurants in London as sumptuous in decoration, but nothing so original; fantastic though it may be, it is at least interesting. A presentation writing desk for an eminent official, the illustration of which forms a frontispiece to the number, is a very charming piece of cabinet work, designed by Herr J. Olbrich.

The *Moderne Bauformen*—"modern forms of architecture" (published by Julius Hoffmann, Stuttgart), seems to be intended to give monographs on the work of special architects; the last number that has reached us is occupied with illustrations of buildings and designs by Herr Hermann Billing, of Karlsruhe, an architect whose name we have not heard before, but who seems to be an artist of much variety and originality of ideas. The design for a bridge over the Rhine at Ruhrort, with a castellated tower on each side of the approach, connected with the bridgehead by a quadrant colonnade, is a striking conception; and many of the illustrations of interiors show interesting points of architectural treatment.

The most interesting article in the *Architectural Record* (New York) is one on "Boston Suburban Architecture"; at least the numerous illustrations are very interesting, and show an obvious desire in a good many instances to keep up something of the tradition of Old Colonial architecture.

Mr. Arthur P. Nicholson contributes to the *Nineteenth Century* an article on "The Norwich School and their Last Exponent." By the last he means the late Arthur Stark, the son of the better known James Stark of "the Norwich School." We put the phrase in commas because we think it is open to argument whether there really was anything that could be called a Norwich School. There was a Norwich group of artists, who, born in and best acquainted with the same country, painted to some extent the same scenery, with the exception of Cotman, who was more especially a sea-painter. But after all there is very little in common between the styles of Crome, Cotman, and James Stark—to take three of the most prominent names; they can hardly be said to form a school. Of the younger Stark we confess to knowing little, and as probably a great many people interested in painting are in the same case, the article is a useful one. There is a good deal in it that is interesting about Crome and Cotman, of whom Arthur Stark, who died only four years ago at the age of 71, had many personal recollections which he communicated to the author of the paper.

Scribner contains an article by Mr. C. Grant La Farge on the new Cathedral of St. John the Divine, New York. It appears to be of a very bold design in one respect, viz.: that it is intended to have a wide area at the crossing, as at Ely, but to surmount this not with a mere lantern, as at Ely, but with an immense central tower the width of the whole central area, and crowned with a spire. To stiffen the great arches and resist the immense thrust of the superincumbent weight on them, there are eight large buttress masses planted a little way from the crossing arches in each direction, and connected with the crossing piers by what may be called lean-to arches or flying buttresses of immense size; these will apparently form part of the visible interior architectural design, leaving on the ground level a clear passage between the buttress piers and the crossing piers. It is a very bold device structurally, but we rather question whether the effect will be very good, at least in respect of the buttresses running east and west parallel with the long axis of the church; we should certainly prefer the solid pier masses of Tewkesbury. From the photographs we gather that the building has proceeded no further as yet than the erection of the eastern crossing arch and its buttresses. The design is rather a curious combination, for the interior apse of the choir is to be defined by an immense colonnade of what look, in the small illustrations, like columns of the Corinthian order, with stilted round arches springing from them; one of the photographs shows the columns as placed in position, but without the capitals. The cathedral is very large and very ambitious, but it strikes us as rather an architectural medley.

To *Harper* Mr. Edmond Gosse contributes an article on a very interesting subject of which little has been known hitherto—"The Lost Tapestries of the House of Lords." These tapestries were entirely destroyed in the fire of 1834, which preceded the building of the present Houses of Parliament; but it appears that an engraver, one Pine, had in the reign of George II. made a series of careful engravings from the tapestries, and published them in a folio volume which he dedicated to the King. From these engravings a good many reproductions are given to accompany the article. The tapestries illustrated the invasion and the repulse of the Spanish Armada. They were designed by a Dutch artist, one Hendrik Vroom, and were made at the instance of Lord Howard of Effingham (subsequently created by Elizabeth Earl of Nottingham), apparently with the object of celebrating his own glory in directing the defeat of the Armada. One of the engravings shows Lord Nottingham, in armour and with a tall hat on, seated on one of the massive rearing horses of the period, "directing the attack on the Spanish Armada." In 1616 Lord Nottingham, then at age of 80, sold the tapestries to James I. for 1,628*l.*—as Mr. Gosse observes, "a large sum in those days, yet nothing to what their value would be to-day in the auction rooms of Europe." It appears that James had them hung up somewhere in the precincts of the House of Lords, and during the Commonwealth they are specially mentioned as "reserved for the service of the State, and that the same be hung up in the House, late the Lords' House." Cromwell had always an eye to anything which promoted or recorded the greatness of England. There, presumably, they hung till the fire which destroyed the House, tapestries and all. For further details, and how the Dutch artist Vroom came to be employed in the matter, we must refer the reader to Mr. Gosse's article. It is an exceedingly interesting history, and we may thank Mr. Gosse for putting it into literary form.

The *Century* contains a very interesting article by Dr. Ayers on "Colour-blindness," including some special remarks on "Art—Artists—and Colour-blindness." Dr. Ayers declares that a considerable number of artists, even successful ones, are more or less colour-blind—that is, blind to certain colours or to one colour. "A green-blind artist will place a brown skein of worsted with the green as readily as a layman." He adds—"A perfect analogy to the artist colour-blind would be a perfect piano with the musician deaf to certain notes; in which case he would learn to use such notes mechanically, though not hearing them at all. Nevertheless, his work is handicapped." The subject of the relation of the artist's eye to his picture is a very interesting and curious one. It has been supposed by some critics that Turner's gorgeous colouring in his later works was partly due to failure of eyesight, and that he did not see his own colouring as others did. The article is accompanied by two or three comparative series of colour prints, showing a scene or a spray of flowers as seen by the normal eye and as seen by eyes blind to red or green. Those who are so would, we suppose, see the two plates the same colour, or with only a difference in depth of tone. But these representations of what is seen by other eyes must be to a great extent conjectural. Probably few people see things exactly the same colour. The same issue also contains an article by Mrs. Pennell on Rheims Cathedral, with illustrations by Mr. Pennell of his usual rich and effective but (for architecture) rather too sketchy character.

The *Home Counties Magazine* contains three articles of considerable interest in regard to the history of three old buildings; one of them of worldwide celebrity, viz., the Globe Theatre in which Shakespeare's plays were acted. Mr. Martin, who writes the essay (which is to be continued), is endeavouring to bring the history and aspect of the building before the reader by the help in part of reproductions from contemporary views of the "Globe" and of the general neighbourhood of "Bankside" where it was erected. It is curious to realise in what modest and restricted surroundings some of those plays were first seen, which are now given with all the adventitious aid of elaborate scenery and machinery. Mr. Wadham Powell continues a history of Bulstrode House, and Mr. W. L. Rutton contributes a long history of Temple Grove, East Sheen, Surrey, once the home of the Palmerston family; *the* Lord Palmerston, the last of the line, had to sell it, or rather it was sold by the trustees under his father's will before he took any possession of it, and seems afterwards to have been transformed into a school which is supposed to have furnished suggestions for the sketch of Do-the-Boys Hall.

CHURCH HALL, IPSWICH.—A church hall connected with St. Helen's parish, Ipswich, has been opened. The hall was originally a school, and the plans for the necessary alterations were prepared by Mr. T. L. Rees, architect; the builder was Mr. F. Bennett.

THE ARCHITECTURAL ASSOCIATION.

AN ordinary meeting of the Architectural Association was held on Friday last week at Tufton-street, Westminster, S.W., Mr. Walter Cave, Vice-President, in the chair.

Elections.

The minutes were read and confirmed and the followng gentlemen were elected as members :—

P. J. Adams, Buckhurst Hill, Essex
P. M. Andrews, West Acton
H. M. Archibald, Stockwell
F. E. Cannon, Stockwell
W. C. L. Cheriton, Streatham
D. H. Fish, Woodford Green, Essex
W. S. Grice, Ealing
F. B. Last, Crayford
H. T. Lubbock, Gledhow-gardens, S.W.
A. H. Moberly, Campden House-road, W.
H. E. Moss, Surbiton
E. W. Mountford, Lancaster-gate, W.
H. R. Peerless, Reigate
A. T. Phillips, Rickmansworth
R. Phillips, Parson's Green, S.W.
C. B. Reid, Camberley
A. W. Robertson, Westcliff-on-Sea
A. L. N. Russell, Jedburgh
R. Walker, Burwash
H. Skyrme, Hereford
D. Colville, Kennington Park-road S.E.
T. Swales, Rangoon.

Mr. Hy. Tanner, junr., Hon. Secretary, announced that the annual dinner will be held on May 3, at the Georgian Hall, Gaiety Restaurant. Tickets, 5s. each, may be obtained at the office.

The House-list.

The Chairman then read the House-list for officers for session 1907-1908, as printed in our issue for March 30, and the following gentlemen were elected to act as scrutineers, *i.e.*, Messrs. J. W. Dennington, W. A. Jeckells, C. W. Beaumont, W. Baird, P. J. Turner, and L. Jacob.

Westminster Cathedral.

The Chairman said he had much pleasure in calling upon Mr. J. A. Marshall to read a paper on "Westminster Cathedral."

Mr. Marshall said :—"Twenty-eight years ago, in a house once occupied by Edmund Burke, who wrote an essay on "The Sublime and the Beautiful," a number of assistants were engaged in working out the designs of a well-known architect. These designs were for important buildings, in all styles, ranging from the Romanesque to the Renaissance, and they showed a power and a knowledge of detail unsurpassed, we believe, at that time. Before entering on his duties the assistant was told that he would not be expected to design, but merely to exercise care and judgment, and to take an interest in his work. From the time when he entered this realm of art in the morning until his departure in the evening he was virtually a prisoner, and the annual holiday was a reprehensible undertaking, rather than a recognised institution. Smoking, whistling, and gossiping were strictly prohibited, and to take off one's coat for greater freedom or coolness was pre-eminently disrespectful, not to say vulgar.

But undue restraint—if such it was—engenders reaction, so whenever a suitable opportunity occurred—it may seem strange to you—conventionality was cast aside for uncontrollable outbursts of boyhood; the "Sublime and the Beautiful" were then forgotten, and not a thought was given to the occupant of the room below ours, until we received this charming admonition from our respected master :—

13, John-street, Adelphi, W.C.
April 3, 1879.

GENTLEMEN,—

Mr. G. writes, complaining of the unnecessary disturbance you indulge in, and requests me to ask you to refrain from making more noise than is essential to the performance of your duties. I feel sure, after this, neither of you will give cause for further complaint, inasmuch as it is unbecoming to engage in acts that affect the dignity of an office and the peace of a neighbour.

Yours faithfully,
JOHN F. BENTLEY.

And now, gentlemen, in the face of this somewhat humiliating confession, you will understand that we scarcely dared to presume to accept the invitation of your Council to read a paper on the Westminster Cathedral, and in view of what has already been written on this great work of Mr. Bentley's by men of "light and leading," we have also to confess to a feeling of surprise that the subject should be considered to possess some latent interest that has not yet been revealed.

Perhaps it was thought we might be able to explain the apparent incongruity or contradiction in this last phase of Mr. Bentley's artistic development, how—like Athene from the brain of Zeus—this strange design, of noble proportions, could be produced in so sudden and complete a manner by one of the latest exponents of the Gothic revival. Or was it expected that some light could be thrown on Mr. Bentley's intentions respecting the completion of a building that may be said to rank with those of national importance?

As the effacement of man's work—by the hand of time—increases our curiosity to look into the past, so does the unfinished production impel us, with equal and perhaps pardonable curiosity, to look into the future; not merely to speculate as to what might have been had the master lived to finish his work, but to wonder what may happen in the absence of his guiding influence.

You remember that touching incident related by Vasari, how the pupils of the immortal Raphael placed at the head of the bed on which their dead master lay his unfinished picture of the Transfiguration, while they stood around like helpless orphans. You will, I am sure, agree that that picture should have been allowed to remain just as it left the master's hand, without the profaning touch of any pupil.

The simile need not detain us, yet we cannot forget that an unfinished building, in occupation, is not quite the same thing as an unfinished picture or piece of sculpture; existing contracts have to be carried out, and the varied requirements of the occupants have in some way to be met, yet we all fully realise that the peculiar impress of the work carried out under the personal supervision of the original architect can never be revived, nor can it, in this instance, be emulated.

Reverting for a moment to the supposed inconsistency of style, it is not necessary to remind the members of this Association that the training of an architect is now very different from what it was ages ago, when the builders of each country worked in only one traditional style that could easily be adapted to the simple requirements of the community. Then, the young architect—we are told—learnt the principles of his art, profession, or craft, on the building, in the workshop, and at the guild. His whole environment was redolent of lime, timber, stone; he was not afraid of soiling his gloves, nor of crushing his silk hat against the scaffolding; paper and rubber were not part of his outfit, and drawing, as we understand it, not one of his qualifications.

If one of these obscure cathedral builders could enter this room to-night we would ask him to tell us more about this, and in return initiate him into the mysteries of modern practise; he would then realise that the times had, indeed, changed; that vast storehouses of knowledge were open to us that were quite unknown to him; that the demands on the skill of our architects are so bewilderingly varied and complex as to prevent the universal application of any particular style, old or new; and that the life-work of a modern architect has not infrequently presented an epitome of the styles of all ages.

He would learn that we spend most of our time in the "office," and some of it on the building. And, lastly, the perspicuity of our building regulations and the simplicity of our sanitary requirements would equally astonish him, were it at all possible for us to explain them.

If our visitor happened to be an English, or, say, French architect of the mediæval period he would, of course, not quite understand the style of the Westminster Cathedral. He might possibly detect in the plan the Christian symbol of the Cross, and he would recognise as old friends the gaunt Norman-looking transepts and the well-buttressed choir; the sheer unbroken height of the campanile might win his admiration, but the inconsistent treatment of the roofing and the peculiarities of the west front would certainly puzzle him and provoke the question as to whether these were the outcome of necessity or of design.

If the exterior betrayed to his mind some slight acquaintance with the work of his own period, the interior would bear no such trace; for a moment the unconcealed austerity of its structure might remind him of some early abbey or conventual church, but he would soon find that the resemblance was more visionary than real, and that, after all, it was not a Gothic building that had served as the prototype.

He would rightly infer that it was not intended to hew the brickwork into clustered shafts and mouldings, and until he detected the proposed scheme of marble and mosaic decoration, his only conclusion would be that it was intended to plaster the whole surface with a view to painted decoration—or, possibly, whitewash.

Development of the Plan.

But let us assume that our visitor is one of those Greek architects who, we are told, crossed the Adriatic to build St. Mark's, Venice. On approaching the western façade he would be disappointed not to find a spacious and well-lighted outer narthex, forming an ambulatory or vestibule comprising all the main entrances, but this feeling of disappointment would soon give way to one of satisfaction when he entered the nave and realised the striking influence of his own work, after ten centuries of time. The main structural ideas, necessitated by the statical requirements, would be familiar, and so would the proposed method or scheme of applied decoration.

He would note, however, with regret that the cruciform or symbol on the plan appeared to be tolerated rather than emphasised, and we should hasten to explain that, though the architect's starting-point was the Cross, his ultimate idea was an unbroken nave, or hall, some 20 ft. wider than St. Mark's, and that the transepts should not be regarded as part of this space, but rather as extensions of the eastern chapels.

"I see that is so," he would respond, "but in our basilica at Venice we made the transepts as important as the nave, and covered them with domes in the same way, and I cannot help feeling that this arrangement—apart from any religious sentiment—is a more perfect ideal, and gives additional charm or variety to the interior."

"Possibly," we should cautiously observe, "and it may interest you, sir, to know that your church at Venice has been so much admired—since your retirement—that its predominant idea has been copied elsewhere almost line for line. And it may still further surprise you to learn that the architect's first conception for the Westminster Cathedral was a bold attempt to realise these very qualities that appeal to you so strongly."

Regarded as the tentative scheme of a great architect for so important a work, the first sketch plan, made twelve years ago, is interesting, though it doubtless lacks the homogeneity and the statical completeness of the final plan. And should our friend be curious to know why this first conception was abandoned, we should have to explain that the more the architect considered the matter the less satisfied he felt with the transeptal arrangements and the "crossing"; the abutment for these parts, in the east, was insufficient, and the complications connected with the exterior were not encouraging; then it was decided that the eastern termination of the church should not be used as a sanctuary, but as a choir; it was also decided to limit the sacristies to one side of the building, and to rely on the aspiration of a single campanile rather than on the conflicting efforts of two. In the revised plan the sanctuary and the choir have changed places, aisles have been introduced between the sanctuary and the eastern chapels, thus improving the abutment, but necessitating the abandonment of the apsidal terminations of the transepts, in order to provide suitable approaches to the eastern chapels. The transepts having now lost their peculiar form, we find the architect resorting for internal effect to another ideal, which, in the course of his practice, had become so indelibly stamped on his artistic temperament that it invariably appeared in the churches designed by him. We refer to the unbroken continuity of the nave arcades and vaulting across the transept openings, without entirely sacrificing the cruciform plan. This unbroken rhythm, or repetition of parts, produces an impression of length and height—a vista, if you will—that was most attractive to the English architect. And we should ask our visitor whether a similar effect was not produced by filling in the side arches of the great prototype at Constantinople. "Quite so," he would reply,

"but in that case the artistic effect of the expedient was not the primary object, and the buoyancy of the culminating dome has scarcely been impaired. Permit me, further, to say that I think I now realise what I may term the vital difference between your cathedral and our great churches of the East. At Constantinople and at Venice the supports are concentrated, or limited to a few positions, whereas at Westminster, in addition to the main supports, auxiliary piers and arches are introduced that give a distinctive character to the design, suggestive, if I may say so, of a commingling of our Eastern with your Western methods; it is only in the sanctuary of your cathedral that I can detect the structural lines of the Greek type reproduced in their integrity."

Again, it would be still more interesting to some of us to know the views of yet another architect, of a period still more remote—one of those builders of Imperial Rome whose colossal works are still the wonder and admiration of the world. We should prefer to conduct this gentleman, blindfold, into the cathedral, and suddenly reveal to him the vast expanse of its interior; then, if he did not think that he was in the tepidarium of a large bathing establishment, we should say that he had never seen one. The length of the nave agrees with that of the central hall of the Thermæ of Diocletian, but the width, instead of being merely 60 ft., as it is, should be increased to 80 ft.; then, if the secondary piers and arches are obliterated—thus reducing the supports to eight in number—and the pendentive system of vaulting changed into the groin-vaulting of the Romans, the illusion will be well-nigh complete.

On leaving the building our Roman visitor would be startled, not only by the determined aspiration of the campanile, but by the ornate qualities of the exterior generally; he would miss the sturdy vigour of his own work, and his limited acquaintance with architectural styles would not enable him to detect the strong influence that Byzantine, Romanesque, and Renaissance detail have had on the design.

Having now, by retrogression, drifted to the source of the Renaissance, there is an obvious temptation to overleap the intervening ages at a bound, and so reach that "harbour of refuge," that "sheet anchor" of the modern practitioner. We do not, however, propose to invoke the shade of any past, nor the person of any living votary of that accommodating and fashionable style; and cordially as we should welcome the apparition of the greatest architect of the English Renaissance, we appreciate the delicacy of the situation, and proceed without further delay to take a closer view of our subject.

Support and Abutment.

You will have gathered that the dominating factor of the problem worked out by the architect has been a spacious and uninterrupted nave, covered with domical vaulting, and it will be obvious to you that the exceptional width of the space to be covered called for exceptional height, if due proportion of the interior was to be maintained.

Thus the difficulties of support and abutment were soon realised, and in selecting the pendentive dome of shallow concavity for the roofing, the architect believed that the weight and the pressure would be reduced to a minimum. By showing the domes outside, not only was an extraneous roof dispensed with, but full advantage of the height was gained for the interior.

In the disposition of the piers and abutments, with a view not only to the sustentation of the pressure, but to reserving as much space as possible for the aisles, chapels, and galleries, a system has been adopted not unlike that to be seen in most Gothic cathedrals, where huge, yet narrow, counterforts are projected at intervals, and stiffened by transverse walls, arcading, and vaulting. But while in a Gothic cathedral these counterforts are generally most conspicuous features outside the building, at the Westminster Cathedral they are practically limited to the interior, the spaces being entirely utilised. It may be noted, in passing, that in the latest instance of cathedral design in this country both these methods have been rejected in favour of one in which all buttresses, as such, are avoided by deeply recessing the alternate bays as transepts; and should this arrangement involve a sacrifice of that uninterrupted succession of parts that Mr. Bentley so much admired, it will be admitted that this is not the only quality that can be legitimately aimed at, and it is probable that the result at Liverpool may disclose quite opposite qualities that will fully compensate for the loss referred to; at present we can only wish every success to the young architect who is now engaged on this important work.

Confining our attention for a time to the nave of the cathedral, let us more carefully examine the counterforts and the vaulting they sustain. A reference to the plans will show you that only in one instance is a main counterfort permitted to retain what may be termed its simple, unaffected character, all the others being more or less influenced or modified by the exigencies of the plan; thus two of them form the flank walls of the transepts, where, on the east, they are further strengthened by the walls and vaulting of the sanctuary so as to resist the cumulative pressure of the nave vaulting. At the west end of the nave the corresponding abutment has been very considerably affected, not to say weakened, in the upper part by the retiring disposition of the western façade, a concession to light and air claimants.

Of the secondary counterforts, those dividing the transepts have also a distinct and complicated character, while the others retain their simple form—excepting that next the campanile, but this of course affects only one side of the building.

The proportions of each compartment of the nave are those of a cube, up to the springing of the main arches 60 ft. from the floor. Another 30 ft. 4 in. and we are at the springing of the domes; the total internal height being 111 ft., or about 10 ft. higher than the choir of Westminster Abbey.

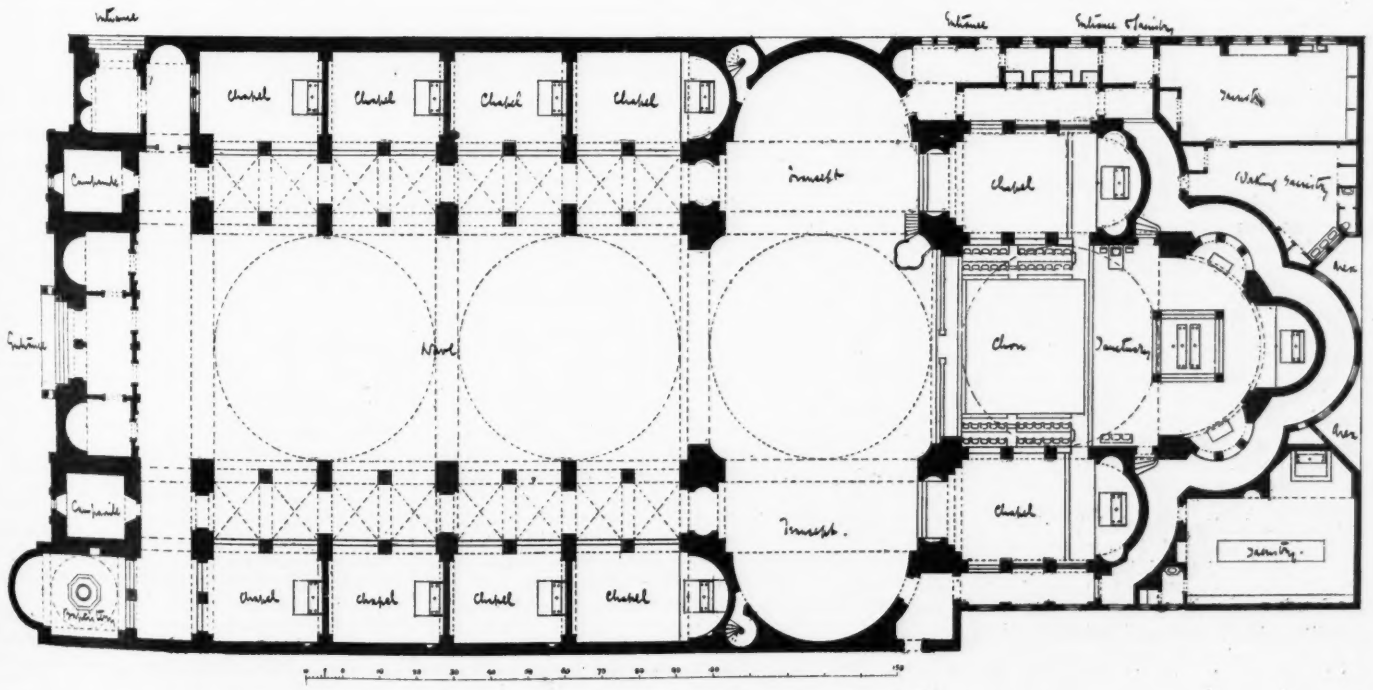
The extreme projection of the counterforts is 48 ft., but just above the chapel vaulting this projection is suddenly reduced to 24 ft., at which it is maintained to a height of nearly 90 ft. The lower projections—forming the divisions between the chapels—are but little more than "flying buttresses," filled in with thin walls, so as to form recesses for the altars.

The enclosing walls, with the brick vaulting over the galleries and transepts, serve of course to stiffen the counterforts and to increase the abutment; but the lower concrete vaulting of the aisles and chapels is not so important in this respect, and its construction was deferred until the main parts of the building were finished and the full pressure of the superstructure had been realised.

And here the suggestion can scarcely be evaded that this part of the design does not so exactly express the construction as do some of the other parts; for the massive walls of the triforium are not—as might be supposed—supported on the arcades that divide the chapels from the aisles, but on segmental relieving arches, turned over these arcades between the counterforts and concealed in the pockets of the vaulting. The span of each relieving arch is 25 ft., and the skewbacks are not cut into the piers, but are formed on granite springers that project beyond.

This expedient to reduce the span and maintain the piers intact was most essential next the transepts, where the triforium wall suddenly stops, and the abutment has been weakened by the formation of a passage in the wall of the transept. In view of this, and the complicated section of the relieving arches—due to the difficulty of clearing the vaulting of the chapels—you may perhaps wonder why so favourable an opportunity for the use of steel girders that involve no thrust and occupy but little space should have been neglected; but the architect resolved not to introduce into the cathedral any ironwork as a support, though, as we shall see, he did not feel justified in objecting to its use as a tie.

The projections or buttresses between the lower windows of the triforium or gallery have an artistic value, though they serve no structural purpose. They are apparently supported on the flat roofing of the chapels, but they are really dependent on stone



Plan of Westminster Cathedral as First Proposed.

corbels that rest on the relieving arches and blush unseen.

You will now see that the chapel arcades and vaulting are relieved of all extraneous weight, and it has been possible to make the arcades very slender, thus gaining extra space for the chapels, and imparting to these minor parts of the building a suitable relative proportion or scale. You will also now realise the importance of the galleries, in disguising or masking the apparent weakness of the construction behind—just as a balcony is often projected along a façade as an antidote against the weak appearance of a ground floor story.

The archways formed in the lower part of the counterforts to preserve the continuity of the aisles, galleries, and passages have been kept as small as possible, but in the upper parts hollow spaces have been left to economise material. These spaces were not enclosed until the brickwork had been exposed some time to dry, and small openings for ventilation were left in the upper and lower parts of the cavities to facilitate the drying after the enclosing walls were built. It was also desirable to keep these walls down until the cavities were arched or corbelled over—as the case might be—to prevent the accumulation of rubbish that would have blocked up the ventilators at the bottom.

The main counterforts are 10 ft. 6 in. wide, and from these, at a height of 60 ft. from the floor, spring the large transverse arches 6 ft. 9 in. wide that support the pendentives and the domes. As the thrust exerted by these arches and the pendentives is at a level much below the springing of the domes, it was not considered necessary to raise the main counterforts higher than the lean-to roof of the passage over the triforium vaulting; but the secondary counterforts, placed opposite the centres of the domes, are raised well above these roofs and weighted with turrets, the supporting arches and wall at this level being comparatively thin.

We have already referred to the exceptional character of the counterforts dividing the transepts. These, you will notice, consist on the ground plan of two piers, one next the nave, the other next the outer wall, the space between being arched over, just above the level of the gangways or galleries that cross the transepts. To dispel the weak appearance of the pier next the nave, and to ensure a uniformity of scale on the ground floor, the openings between the piers are filled in with arcades that agree in height with those of the galleries; but these arcades do nothing towards counteracting the thrust of the arches over, and, indeed, they were not inserted until long after the main parts of the structure were built. In building the pier next the nave the precaution had been taken to make it 9 in. wider than the corresponding piers of the nave, but this was not considered sufficient, so a rolled steel tie was inserted just below the springing of the arches, where it would be eventually concealed by the arcades; and at a higher level, just above the crown of the arches, another similar tie was built in. When it is considered that the turrets of these transept counterforts are directly over the arches, and that the arches sustain nearly half the weight of the vaulting and the roofing, and that one of the domes is partly dependent on the pier, it will be admitted that these precautions are not altogether uncalled for.

At the west end of the nave the bewildering ramifications on the ground floor promise well for the abutment at higher stages of the work; but as we ascend the gradual recession of the western façade soon dispels the illusion, until, on the top stage, where the pendentives exert most pressure, we find that counter resistance has been reduced to a minimum. Another effect, due to these legal restrictions, appears inside the building, where the perimeter of the western dome seems to be too near the large west window—a deep barrel vault over the window, as originally intended by the architect, would have afforded better resistance and greatly improved the interior.

Having now considered the main features of the nave, regarding support and abutment, we will go back in imagination to that stage of the work when the main supporting arches had been turned, and the centering for these was still in position, there to remain until the final weight had been imposed.

On the north and south sides these main arches were not turned until the lower secondary arches and the brick filling over were finished, so that the brickwork served as centering for that portion of the main arch that passes through the wall; but for the projecting portion, on which the pendentives rest, it was, of course, necessary to provide thin centering of wood. At the springing level of all the arches and brick barrel vaulting, rough stone corbels were built in to support the centering, the projections being afterwards worked off. The spandrels of the main arches are filled in up to the crown level with brickwork, set back 13½ in. from the faces of the arch, to reserve a seating for the concrete of the pendentives. The visible junction of the brick arch and the concrete forms merely an angle or line, and if we follow these lines down to the springing where the supporting arches separate we shall find them meet, so that the surface of the pendentive expands or develops from a mere point, but this apparent weakness in the construction is obviated by the very common method of building the lower portion of the arches and the pendentives of brick, in horizontal courses; thus a continuous joint is avoided by cutting the brickwork to the required angle, and the top of the brick corbelling forms a seating of considerable area for the solid concrete backing.

The lower portion of the pendentive, just described, rises to a height of 13 ft. above the springing; fixed centering for this part was not necessary—the accuracy of the demi-spherical curves being ensured by the application of movable templets. But, for the upper part of the pendentive, closely-boarded centering was necessary and to support this at the bottom a projecting stone landing was built in on the top of the brick corbelling, the projection being afterwards worked off. To secure bond for the concrete backing of this upper part, and to distribute the bearing, 6 in. stone landings are built in at intervals, in the height, across the angles formed by the enclosing spandrel walls.

Projecting courses of brick are also formed on these walls to serve as a key for the concrete. To limit the weight, the top part of the pendentive has no solid backing; it is, in fact, built as part of a dome, having a shell 2 ft. 6 in. thickness, but on this shell radiating counterforts or ribs are formed that incline up to the base of the dome, and on these counterforts there are light sleeper walls that support the flat roofing around.

To ventilate the cavities 4½ in. drain pipes were inserted in the shell, and counterforts communicating with the interior of the building. Constructionally, the pendentives may be regarded as corbels, by which the weight of the domes is not merely sustained, but directed to the piers.

Nave Domes.

The circle, developed by the pendentives, is 60 ft. in diameter; the base of the dome is corbelled over from this, so that the springing is clearly defined and a salient angle at the junction of the two surfaces is thus avoided, for the convenience of the mosaic workers of a future generation.

The thickness of the domes at the springing is 3 ft., which is gradually reduced to 13 in. at the crown; the curve of equilibrium is, therefore, well within the material.

The domes were turned on closely-boarded centering, in a series of superimposed rings of concrete averaging 4 ft. in width. The concrete was not reinforced in any way. The centering consisted of radiating trusses supported from the ground on uprights 90 ft. in height, made of stout planking, bolted together, so as to break joint, and cross-braced at intervals. It was, of course, important to have the centering perfectly rigid to preserve the true curvature of the concrete until it had finally set. Full responsibility for the centering rested with the builder who had contracted to carry out the work; and if his method lacked the daring and skill of a Brunelleschi, or a Fontana, he certainly incurred no risk, and did not stint the timbering. The eastern dome of the nave was turned first, then the dome of the sanctuary, next the middle dome of the nave, and lastly the western dome. Their construction occupied about fourteen months.

The independent external covering of the domes is formed of 3-in. artificial stone slabs, cast to the curve. They rest on radiating ribs 5 in. deep of similar material, fixed on the concrete, and rebated to receive the slabs, thus leaving an air space of 2 in. between the inner shell and the outer covering, the object being to render the temperature of the interior more uniform. The top and bottom joints of the slabs are rebated. At the springing and at the crown the spaces between the ribs are left open for ventilation, and to prevent the wet being driven into the cavities at the top a circular raised curb is formed on the top edge of the upper slabs, over which is placed a domical capping that allows the air to circulate freely. A reference to the diagram will make this clearer to you.

To form the outer covering, more than 600 slabs were required for each dome; the exposed surface is, therefore, an elaborate network of jointing, and we cannot but feel that an outer coating of homogeneous asphalt would have been more impervious. You will note that by rebating the ribs for the slabs, each radiating section of the covering is kept in position independently of the rest.

The concrete flat roofing around the domes is covered with asphalt that passes up the lower portion of the dome to a height of about 4 ft. 6 in. under the outer covering, where it is keyed into the concrete.

The Sanctuary, etc.

The eastern portion of the Cathedral, comprising the sanctuary, the lateral chapels, and the choir, presents a system of construction essentially Byzantine, the luminous corona of the sanctuary dome being raised aloft on vaulting that seems to be independent of direct support. This buoyancy is due to the extensions that open out on all sides, equal in span to the dome itself. The enclosing walls of the sanctuary on the north and south have very materially affected the design of the eastern chapels. Originally, these chapels were to have been enclosed by slender arcades, on marble columns, corresponding with those of the organ galleries adjoining; but, as in the case of the chapels of the nave, it was soon found that these arcades would not be sufficient to sustain the weight of the walls over which are the highest in the building; so the columns were changed into brick piers, and the two end bays of the arcades were filled in, leaving only two bays open in the middle and a couple of narrow doorways at each end for access to the aisles. Over the filled-in bays are built the solid portions of the outer wall, against which the organs will probably be placed, while over the two open bays is built the lighter portion of the wall, containing the windows.

The weight of this central part does not, however, entirely depend on the arcade below, for, above the two lower windows a relieving arch is turned that transmits the weight of the upper part of the wall to the solid portions at the sides, and to still further reduce the weight that portion of the brickwork under the relieving arch and between the windows is built hollow.

The Galleries.

The organ galleries are independent factors of the construction and, like the galleries of the nave, were left down until the main parts were built. The concrete vaulting of these galleries and the western gallery of the nave is not let into the walls at the back but supported on brick and stone corbelling so that the walls are not weakened; the concrete was, however, keyed to the wall by projecting courses of brick, and as an extra precaution the column supporting the vaulting of the organ galleries are tied to the brick wall by gunmetal ties, while for the west gallery of the nave ties were inserted at the floor level of the gallery where the wall of the narthex has most resistance.

The side galleries of the nave have no supporting wall at the back excepting that next the campanile but the arcades that carry the vaulting are comparatively short and resistance to any forward tendency is provided by the main piers. It may here be mentioned that the vaulting of the crypt was also delayed until the superstructure was finished.

You now see that in no part of the cathedral does the main structure depend on marble columns, and this arrangement will be appreciated by those who have experienced the uncertainty of getting large marble monoliths delivered by a stipulated time.

The Byzantine builders had the advantage in this respect; their quarries were often the dismantled basilicas and temples of the Romans, where they found columns ready to hand. But the primary objects in delaying the subsidiary parts of a building are as you know to give the main parts time to find their permanent settlement, and to avoid interference with the scaffolding and exposure to the weather. The accumulation of rain-water in the pockets of the upper vaulting of the cathedral was sometimes a great nuisance, and holes had to be left in the brickwork for temporary shoots or spouting. During the very hot weather when the domes were being turned they were sprinkled with water to prevent the concrete setting too quickly.

The Sanctuary Dome.

We are now in a position to examine the eastern dome that differs in several respects from those of the nave. Unlike the latter that seem to rest on the flat roofing of the church, the dome of the sanctuary emerges gradually out of the substructure, the extrados of the pendentives forming a pyramidal series of offsets or steps that follow the plan of the dome. The reason for thus exposing the pendentives outside was to limit the height of the supporting walls on the north and south so as to give greater elegance to the eastern turrets and to bring this part of the building into closer harmony with the choir. To further this object the vaults over the organ galleries are also exposed, the whole group presenting a subtle gradation of parts, more Oriental than the rest of the building, and perhaps more expressive of the internal arrangements.

The abutment for the main supporting arches of the sanctuary dome is provided by the staircase turrets on the east and by the transept piers on the west, while for the dome itself abutment is provided on the north and south by the vaults over the organ galleries, on the west by the dome of the nave, and on the east by buttresses built on the wide supporting arch that forms part of the vaulting to the choir; these buttresses are stiffened by the outer wall of a passage-way that passes through them to provide communication between the staircase turrets.

The circle developed by the pendentives is 52 ft. in diameter. On the closely-boarded centering for this dome, other centering had to be constructed for the window openings, the reveals of which represent a series of counterforts all round the dome. Centering had also to be constructed for the wall of the drum or circular podium designed to disguise the counterforts and to protect the glazing from the drainage of the dome.

The cavities between this wall and the shell of the dome are covered by slabs of concrete weathered to a sunk gutter or channel near the outer edge that conveys the water to projecting spouts or gargoyles placed between the windows. The flat of the drum is covered with asphalt that passes partly up the dome under the outer covering as before described. The exposed vaulting and the pendentives around the dome are also asphalted; the wall of the podium is cemented. All cavities are ventilated by drain-pipes communicating with the outer air.

The Crypt and Choir.

It would be convenient now to inspect the upper part of the choir, but we had better perhaps descend by one of the eastern turrets and begin at the bottom on the very foundations of the church in fact. The floor of the choir is some 13 ft. above that of the nave, so it was almost impossible to avoid the formation of a crypt, only a very slight excavation being necessary to get the required height. The depth of this excavation was, however, limited to a level, below which it was impossible to go by an existing platform of concrete about 9 ft. thick that extends over more than half the site and served as the foundation for an earlier building.

As the top surface of this platform is practically the floor of the crypt the architect was anxious to dispense with footings around the apse inside, a slight departure from the Building Act that was graciously permitted; but on the outside footings were provided, though they were not a structural necessity. At that time these footings were covered by the ground that rose above the floor of the crypt, but a subsequent alteration of the levels led to their exposure and they are now again concealed by a retaining wall that forms a low circular podium between the buttresses.

The eastern termination of the cathedral suggests the Romanesque or Lombardic style if you will of Northern Italy; the crypt opening into the church, with the retro-choir above, closely following S. Ambrogio's, Milan; the open colonnade under the eaves; the timber roof over the vaulting, are all familiar features. The huge buttresses, however, give distinction and resist the pressure of a vault having a span of 48 ft.

Up to nearly half its height this vault is a solid mass of brickwork roughly corbelled over to the curve and faced with concrete. Above ths level the vault is a concrete shell 18 in. thick at the bottom and 12 in. at the crown.

A retaining wall of concrete is built on the haunches to receive the counterforts or sleeper walls, on which are placed the principal trusees of the roof. The buttresses of the apse rise to the height of the retaining wall and the two are connected by massive concrete lintels formed across the gallery behind the buttresses. The gallery is covered with concrete slabs, cast *in situ*, that form a flat around the timber roof. To prevent the arcades of the gallery being pushed out by the expansion of the concrete the flat and the lintels were kept clear of the brickwork until the concrete had thoroughly set; the joints were then made good.

The retaining wall above referred to was raised a little above the flat to form a curb on which is placed the wood plate for the rafters.

The asphalt covering of the flat is turned up the curb and under the plate, the joint being covered by the lead apron flashing of the eaves. The roof is ventilated by drain-pipes that pass through the retaining wall to the gallery. To convey the water from the asphalt-flats throughout the building to the rain-water pipes a dish is formed in the concrete and at the bottom of the dish or cesspool a curved length of glazed earthenware drain-pipe is built in with the socketed end upwards, so that the asphalt could be turned down or dressed into the socket.

All rain-water conductors that are built into the brickwork are formed of glazed and socketed earthenware pipes.

But we must not linger over these details, neither have we time to ascend the campanile. We wish, however, before closing this section of our subject to draw your attention to two singularities in the construction that call for some explanation. Firstly: Why should the vaulting in some cases be entirely of concrete and in others entirely of brick? Secondly: Why should some of the vaulting be protected by extraneous roofs while in other places its surface is fully exposed to the weather? Obviously, where the shell of the vaulting is of a graduated thickness, and curved on plan concrete is the strongest and most adaptable material to use; the complications of groin-vaulting are also most readily cast in this material. So we find, for the pendentives and the domes, for the vaulting of the choir and chapels, for the more complicated vaulting of the crypt, aisles, baptistery, and porches concrete has been used, but for the vaulting of the transepts and the corresponding vaulting of the triforia brick is the material employed in order that the deep soffits of the brick-supporting arches in front may appear as part of the vaulting behind and the line of junction between the two should not show, thus ensuring a uniformity of surface texture until the unaffected dignity of the interior is impaired by the application of something more assertive and restless.

Respecting the contrariety of the roofing, it will be as evident to you as it was to the architect that a timber roof over the nave and sanctuary even of low pitch would have been uncouth and harsh; such a roof would also have been commonplace; whereas these parts of the building have now a distinction not unpleasing and most interesting. Rising as they do from the mighty and unbroken podium afforded by the lateral chapels, they appear disdainful of protection and defy the elements.

But there is a law of contrast as well as of analogy. The limitations of this law are, however, easly exceeded and a watchful eye is necessary to prevent the intrusion of discordant elements. At the Westminster Cathedral the most striking instances of its application are afforded by the campanile and by the roofs and turrets of the transepts and the choir. Structurally, it would have been quite possible and more consistent to have exposed the vaulting outside throughout the building, and we can imagine what the effect would be. But the Greeks did not always expose their statues to the cold; they appreciated quite as much as we do the charm of the rippling garment; even Aphrodite was allowed the luxury of a pair of sandals. And so at the Westminster Cathedral the rounded surfaces of the vaulting are not everywhere exposed, but discreetly concealed in places by extraneous roofs suggestive in a measure of the forms beneath.

A piquancy and an interest are thus imparted to the design. We may theorise about discordant elements, but we are forced to acknowledge the refining influence of the artist's skill.

When we consider the execution of this great design, the way in which the various materials have been put together, it will be admitted that the extreme accuracy and neatness of the work are in striking contrast to that spontaneity and directness of purpose so evident in the Christian architecture of bygone times. These early buildings denote a readiness of execution resulting in a variation of texture quite unattempted, yet interesting and beautiful, and we like to think that this is not entirely due to the hand of time.

We also like to believe, though it may not be true, that when the ancient workman was bedding a stone or laying a brick or driving a pin through a tenon he was not ashamed to finish these slight operations before responding to the imperative call of the foreman's whistle. Nowadays it would seem a man may not do this; his work has no such fascination for him; at the shrill note of the clarion the implements of his toil drop from his hands like red-hot iron and he rushes from the scene as for very life. In these circumstances the architect feels that in the more tranquil atmosphere of his office, when the sublime and the beautiful are not forgotten, he must arrange for every stone and every brick throughout the building; nothing must be left to the workman's discretion or ingenuity, the serenity of the execution must not be impaired even by a putlog hole—and this reminds us that no such hole were permitted outside the Cathedral, where the scaffolding was arranged as for masonry.

The extreme precision of the execution just referred to, if it does not readily betray the hand of the workman, is certainly expressive of Mr. Bentley's desire to soften down the asperities of architectural design. Anything harsh, uncouth, or "out of gear," as he termed it, was always avoided, and if this ultra carefulness sometimes led to a lack of vigour or directness it can truly be said that the mass of his buildings was never frittered away, the dignity of an unbroken roof or the surface of the walling was left unimpaired, the fenestration was faultless, the detail telling yet refined.

Having now dwelt on some of the most salient features of the construction, some reference will be expected in a paper with so comprehensive a title to the internal decoration, intended by the architect to form an essential part of his conception, but which, unfortunately, he did not live to see carried out and scarcely commenced. When Mr. Bentley received instructions to design the Cathedral he had scarcely been out of this country, certainly not to "the land where the citron blooms." He then felt it his duty to see for himself those incrustations of marble and mosaic so charmingly described by Paul the Silentary and John Ruskin. He did not, however, cross the Adriatic nor visit Sicily. He had realised his powers, and was therefore in a position to discriminate. He took with him a small notebook, but excepting four plans of churches it came back empty. He had neither time nor inclination for mechanical toil; that would have dispelled the charm as it did eventually for Ruskin in Venice.

The Italian tour did not determine the style of the Cathedral though it confirmed it.

The first sketch plan made after the architect's return suggests in parts Sta. Sophia, Constantinople, though Mr. Bentley never saw that building; the final plan shows, as we have seen, the influence of St. Mark's tempered by an ideal he had made his own.

Mr. Bentley's suggestions for the revetment of the interior show, as might be expected, an

appreciation of the principles underlying the application of marble and mosaic as exemplified at Vence and at Ravenna.

The well-defined line of demarcation between the two materials at a uniform level; the high and narrow slabs riveted to the walls and piers and "opened out" so that they could not possibly be mistaken for solid masonry; the strips or facets that roughly follow the curves; the extreme thinness of the veneer exposed at all salient angles; and above all the vast expanse of sheeting due to the unbroken wall surfaces and the massiveness of the piers undisturbed by mouldings and made more impressive by the insertion at rare intervals of choicer slabs and by the brilliancy of carving—these are some of the qualities we associate with the ideal type of marble revetment.

This being so it is evident that the essential features of Mr. Bentley's plan scarcely afford scope for a full development of this type. The subdivision or multiplication of the piers and the lack of unbroken wall surface on the ground floor demanded a treatment on independent lines that may perhaps be best described as a compromise between the Byzantine and the Renaissance.

Another marked divergence from the Byzantine type in an opposite direction is seen in the sparing use of columns for the gallery arcades, resulting in a wide intercolumniation, again in favour of the Renaissance.

But if the piers and walls do not present an ideal field for the application of marble this cannot be said of the floor space where unbounded facilities are afforded for that most essential feature from the architectural point of view, a marble pavement throughout the building.

The value of the marble paving in relation to the wall lining can be seen in the Chapel of the Blessed Sacrament and in the two western chapels of the nave. In the nave itself a commencement of Mr. Bentley's scheme for the paving has been made by laying the narthex and the strips or borders between the piers and columns so that these latter are spared the indignity of rising from a platform of wood-block flooring. The marble paving of the sanctuary around the Baldacchino has just saved this immense canopy from a similar insult, though it can never compensate for defects due to the lack of Mr. Bentley's personal supervision. The same may be said of the organ gallery screens adjoining. Unfortunately, while the painter can rectify a weakness or a false note of colour by a stroke of the brush, the designer in marble is committed for ever to the first touch. His only safeguard is to remember that the doctrine of harmony and restraint applies to all the arts, and if an extensive palette is a snare to the painter it is a still greater entanglement to the designer in marble, whose best effects are produced by a limited range of colours.

The most beautiful and varied material used by the architect is soon brought into discredit if misapplied or mixed up with other materials. The simple slabwork of a fishmonger's shop is more impressive than the incoherent displays so often seen in more important buildings, where the chief aim of the designer seems to have been to destroy those very qualities that give value to the material. But the intrinsic value of marble does not depend entirely on the beauty of the colour or the interest of the veining. Strength and durability must be considered, or the result in our humid atmosphere may be as transient if not as beautiful as a sunset or a smile.

In the majority of instances the very nature of the material is against its permanency.

The pasty magma and the infiltrated fractures, to say nothing of artificial "stopping," are the channels most infected by the destroyer. Indeed the few sound marbles of good colour that can safely be used without restraint may be counted on the fingers. The weakest marbles, like certain persons, are often the most attractive; they should be reserved for occasional indulgence only.

I will not weary you more than I have already done by attempting a description of the marbles used at the Cathedral, especially in view of the fact that the subject of marbles in general has only recently been dealt with by those able exponents, Sir Lawrence Alma-Tadema and Mr. William Brindley. We may, however, be permitted to remind you that in the two western chapels of the nave Mr. Bentley initiated the principle of framing the variegated revetment with white marble only; thus there is not that confusion of colour or workmanship nor that rampant effect of the strings, cornices, and architraves that one so often sees when the reverse method is adopted; in a word, the effect is refined rather than bizarre.

The respective merits of these two chapels cannot be considered apart from the mosaics, and if the Chapel of the Holy Souls is the most concordant this is because its mosaic decoration most nearly approaches Mr. Bentley's ideal.

The guiding influence of the architect is here strikingly apparent throughout, and Mr. Symons, who made the cartoons for the mosaics from his own sketches, has admirably followed the architect's suggestions without that self-effacement that would have destroyed vitality. While not opposed to tradition like the 'New Theology' and the 'New Art,' the work is as unfettered in style as the Cathedral itself. If the general effect is satisfactory, the barbarity of the technique may be condoned.

These subsidiary parts of the Cathedral may be regarded as experimental in view of the vast area awaiting decoration in the nave. For this Mr. Bentley left no suggestions excepting details for the marble work. Some men get ideas very quickly, flashes of inspiration, a kind of radio-activity, and the thing is done. Without a moment's hesitation they rush in where angels fear to tread. No wonder their works look raw and unfinished and will not stand the test of time. With others the idea grows or develops, they feel their way gradually, one thing leads to another, and ultimately to a solution of the problem. The result has entailed much labour, though it may seem to have been without effort, the work endures—this was Mr. Bentley's way."

In the discussion which followed,

The Chairman said they must all feel grateful to Mr. Marshall for his wonderful paper about a wonderful building. He had much pleasure in calling upon Mr. Statham to propose a vote of thanks.

Mr. H. H. Statham said that in one respect perhaps he was the right person to propose a vote of thanks to Mr. Marshall, for no one could be more in sympathy with the paper than he was. But there was a slight drawback in that he had not built any cathedrals, and some of the members who had might perhaps have been called upon to propose a vote of thanks to Mr. Marshall for his paper. It was a pleasure to find that they had got back to architecture, real architecture, and not only real architecture but to real building. That was what struck him throughout the whole description of this great work, and on the many occasions when he had seen the cathedral he realised that it was a piece of building on a grand scale in which the whole construction was honest and solid and was what it professed to be. He heard with particular joy the mention of the fact that Mr. Bentley refused to have any steel-work as a bearing-surface in the building. As he went about London and saw those frameworks of steel getting put up in a great hurry against time and then covered over with masonry which pretended to be building and was not building, he confessed he felt mournful, and it was refreshing to hear about a great building built in a different manner. In spite of what Mr. Marshall said in the beginning of his paper as to what the people in the Middle Ages and the Roman period would have thought about the building, and how they would have been puzzled by it and certain features of it, we seemed to have got back to the essential qualities of mediæval building, and it was that which made the building so refreshing. While they must all regret that the great architect had departed, and that he did not live to hear their appreciation of his work, on the other hand, one could not help thinking what a happy man he was to have such a work to carry out. Who of them would not have thought it not to live in vain to have had a chance of putting their mind and whatever genius they might possess to the building of such a work in so truly an architectural manner! In spite of Mr. Bentley's early death, they must regard him as a happy man; he had done a great work, and had left behind him a building with which his name would for ever be associated. He was specially interested in the close of the paper as to Mr. Bentley's ideas for the marble revetment for the building. He (the speaker) confessed he had sometimes wondered whether the interior did not look finer now than it ever could or would look with the marble revetment added. The appearance of those immense masses of brick piers was quite sublime. If it was to be covered with marble, he quite agreed with what was said as to the design being of a simple and broad character; otherwise the grand harmony and breadth of the building would be destroyed. He proposed most heartily a vote of thanks for one of the most remarkable papers they had ever had on what one must consider to be one of the most remarkable buildings of modern times.

Mr. J. E. Newberry briefly seconded the vote of thanks.

Mr. Arthur Keen, who supported, said that what always struck him strongly about this remarkable building was that it was such a complete and perfect answer to those who said that good architecture could be produced only by the methods of mediævalism. Anyone could see as he looked at the Cathedral that every line had been thought out in the office, and it showed, especially the whole of its detail, the most careful and painstaking work on paper, and the effect was as satisfactory in his judgment as mediæval work. A wonderful amount of intrinsic beauty had been given to the detail and a most extraordinary amount of texture to the surface by the careful work and consideration done inside the office. The building he considered most nearly allied to the Cathedral in England was that very remarkable church at Brighton—St. Bartholomew's—one of the three or four initiated by Canon Wagner and carried out by Scott. The church was about 140 ft. high inside, and consisted mainly of one vast nave, with piers on each side 10 ft. square backed up by walls, and the piers arched over at a height of perhaps 50 ft. The whole thing was vast beyond conception. The work was almost wholly brickwork, treated in such a manner as to result in extremely interesting effects inside and out, and the whole building was impressive, depending mainly on qualities which distinguished Westminster Cathedral.

The Right Rev. W. A. Johnson, the Bishop of Arindela, who was called upon by the Chairman, said he was glad of the opportunity of thanking Mr. Marshall for his admirable paper. Mr. Marshall, who had thoroughly taken in Mr. Bentley's inspiration, was for twenty-five years the deceased architect's chief assistant, and when Mr. Bentley died, although the structure of the Cathedral was finished, and although certain of his intentions as to the future decoration of the building had been left, they were filled with anxiety as to the future work; but when Mr. Marshall, with all his modesty of manner, took up the work, they all felt that Mr. Bentley's mantle had fallen upon him, and especially in regard to the decorative work. He did not know whether they had seen the wonderful work of the gates and the screen of the Blessed Sacrament chapel. He did not think he had seen anywhere work executed or designed in metal like that, and it was entirely Mr. Marshall's work. The structure of the Cathedral was finished, and what they wanted now was the decoration. He quite agreed with Mr. Statham as to the anxiety they might feel as to whether the Cathedral, when finished with all the marble and mosaic, would be as grand and impressive as it is now; but he had every hope that if Mr. Bentley's tradition was adhered to and his inspiration followed, they would have a building perfect and not in any way spoilt. They wanted the funds, and they wanted some millionaire to come along and finish the building, but unless that happened he was afraid the Cathedral would not be finished for 200 or 300 years. He had learnt a great deal of architecture and building while the Cathedral was in progress, living close by, and being from the very beginning the Hon. Treasurer of the Building Fund. He was there almost daily, and he remembered that he did not care about going up more than six or seven rungs of a ladder at first, but later on he got his head and was able to go up to the base of the domes without any fear. It was exceedingly interesting to him to watch the building grow, and he thought the centering of the domes was wonderful.

Mr. Barnes, of Messrs. Farmer & Brindley, who carried out the marble work in the Cathedral, said it had been a great pleasure to be associated with Mr. Bentley, whom he had the pleasure of knowing for some time, and more recently with Mr. Marshall. It was a case of feeling one's way under Mr. Bentley's and Mr. Marshall's direction as to what was the best way of dealing with such large spaces so as to give quiet and unobtrusive work, for most of our marble work was spoilt by the introduction of too many colours—the quieter it was kept the better. Then there were the important questions of light, and which position the marble would look best in; and the further question which Mr. Marshall had touched on, as to the extreme importance of the durability of the material, especially for use in building a cathedral. It was no use using a showy material to find that in a year or two the beauty had been lost and the intention spoilt because the suitable material had not been used in the first place. Mr. Marshall's paper had thrown light on what all would regard as one of the greatest buildings of modern times, and although they all deeply regretted that Mr. Bentley did not live to see the completion of his work, yet they must all feel extremely pleased that his mantle had fallen upon Mr. Marshall.

The Chairman, in putting the vote of thanks to the meeting, said he agreed with Mr. Statham that they had had one of the most remarkable and interesting papers from every point of view that it had been the good fortune of members of the Association to listen to, and he felt they were all under a debt of gratitude for the great pains Mr. Marshall must have taken in the production of such a fine literary effort. The model of the Cathedral which they saw before them was also of the greatest interest.

The vote of thanks was then very heartily carried.

Mr. Marshall, in reply, said that his chief regret was that he had not been able to read a paper more worthy of attention. The time had been limited, and it had been impossible to refer to many details that would have been interesting to architects, such as the nature of the materials used in the building; but many of the particulars had been published elsewhere, and were accessible, and so he thought it better to avoid in many respects the beaten track.

The Chairman said that the next meeting would be held on April 26, when Mr. F. V. Simon will read a paper on "Liverpool Architecture."

The meeting then terminated.

THE ARCHITECTURAL ASSOCIATION SPRING VISITS:

VII.—Lambeth Municipal Buildings.

The seventh and concluding spring visit took place on Saturday, the 13th inst., at the new municipal offices of the Borough of Lambeth in Brixton-road, now well on the road to completion. Members of the Architectural Association attended in considerable numbers, and received the personal explanation of the architects for the numerous points of interest.

Our readers will remember the attention given by London architects to the original competition, the results of which we gave, and also illustrations and a criticism of the designs at the time of the competition. Our approval of the assessor's choice and our remarks upon the promise given by the competition drawings are fully upheld in the actual executed work. The architects, therefore, Messrs. Warwick & Hall, are to be congratulated upon the very successful result which they have so far achieved; and, although the buildings are yet to receive most of their internal finishings, enough is seen to justify the best anticipations and the praise which it is our pleasure to bestow.

The site, an open one, is made wedge-shape by two converging streets, upon the lines of which the general offices are arranged. The principal entrance is placed at the apex, while, at a position half-way along these wings of offices, the Council-chamber and rates' offices are located in a three-story block, and thus provide connexion and approach to all parts. The arrangement, which may be referred to as resembling an inverted A, is happily a very convenient one in all respects, and one to be striven for in buildings of this nature. Secondary entrances—for ordinary business—are schemed in the centre of each façade, and provide through passage in the connecting arm of the figure.

Every detail has been well considered, and the resulting consistent spirit in scale, proportion, and design is not the least of many attractive aspects. Portland stone is used in combination with a granite base and thin red brick walling in the fronts and the lower parts of the tower. Stone is massed in the main angle entrance. A quiet dignity, expressive of the purposes of the building, is secured to the design, yet some spirited treatment is given to the entrances and other features which serve to show that the authors have exercised restraint and much pains in arriving at a very interesting conception. As a matter of criticism, we should have preferred a simpler designing of the angle entrance and of the pavilions in the Brixton-road. The authors have here evolved excellent compositions which would have possessed greater force had the dimensions of the building been doubled. This would in a measure have been corrected had the glass line in the windows been recessed to double its actual extent.

The interior has received much consideration. The vaulted corridors are of good proportion, well relieved by piers and plain arches. The wall treatment in plaster panels and the woodwork throughout are excellent. The Council-chamber promises well, although it is a matter of regret that the authors are not to be allowed to include the oakwork, which is so essentially a component part of the whole.

FURTHER NOTES AT THE BUILDING TRADES EXHIBITION.

Notwithstanding the undoubted success of this year's Exhibition, and the fact that every part of Olympia is well filled if not uncomfortably crowded, it must be admitted that several important branches of industry directly connected with the building trades are very inadequately represented (so far as concerns the number of exhibitors) and in some of those which are fairly well represented the visitor will not fail to notice the absence of prominent manufacturers who might be expected to avail themselves of the opportunities offered by this annual gathering of architects, builders, and trading firms.

The most remarkable example of indifference is that furnished by the total absence of structural steel manufacturers, merchants, and with one or two exceptions of constructional engineers. Considering the enormous extent to which rolled steel sections of all kinds are used in modern building construction, it is surprising that not a single exhibit of this material *per se* is to be found at Olympia. The iron foundry trades of Great Britain are only represented in a purely incidental way by manufactured articles, and very few of the firms who make a specialty of cast-iron construction have put in an appearance.

Glass as a structural material, glazing systems for roof-work, ventilating fans, steam and hot-water heating apparatus for public buildings, steel and cast-iron tanks, gas and electric lighting appliances, roofing slates, and lightning conductors are other manufactures in which architects are interested, but have comparatively little and in some cases no opportunity of examining at the Exhibition.

There is a very creditable show of reinforced concrete, cement, and plaster, proving satisfactorily the appreciation by industrial firms of the advantages to be derived from the judicious use of steel in conjunction with materials of low tensile resistance, but several leading firms making a special feature of concrete-steel buildings and floors are conspicuously absent.

So far as we noticed, only one exhibit of a complete building is to be found at Olympia besides the pavilions and bungalows which have already been mentioned in connexion with the stands of various firms. The structure to which we now refer is a timber building with iron roof erected by Messrs. J. Harrison & Co., of Camberwell, and occupied by our contemporary, the *Surveyor*. It is not easy to understand why the numerous manufacturers of iron and other temporary buildings should have thought a Building Trades Exhibition unworthy of their attention.

Gas-engines and Producers.

The National Gas Engine Company (wall space No. 172) exhibit a well-designed gas-engine of 14-brake-horse-power, with two flywheels and electric ignition, this machine being available for use with either town or suction gas. A compactly-arranged plant for production of the latter form of fuel is exhibited in the same stand, the capacity of the installation being about 15-brake-horse-power. Hence the two exhibits of the Company virtually constitute a complete gas-engine plant of a kind specially suitable for hospitals and other buildings where public supplies of gas are not available.

Messrs. Richard Hornsby & Sons (wall space No. 158A) have on view an installation comprising a Hornsby-Stockport 17-brake-horse-power gas-engine, direct-coupled to a Parker continuous-current dynamo, with an output of 8 kilowatts at 220 volts, and supplied with gas from a Hornsby-Stockport suction-producer. This plant is shown in working order, and supplies electric current for lighting the stand.

Messrs. Crossley Brothers (wall space No. 174) have laid down two of their well-known internal combustion motors, one being a quick-revolution electric light engine giving 49-brake-horse-power with town gas, or 39-brake-horse-power with suction gas; and a smaller engine capable of developing 2½-brake-horse-power with town gas. The first engine mentioned is supplied with suction gas from a producer on the stand, and is direct-coupled with a dynamo generating current for the purpose of lighting the exhibit.

Messrs. George Waller & Son (Row B, No. 34), who have recently purchased the business of Messrs. J. Pinkney & Sons, of Smethwick, show a 1-brake-horse-power Pinkney gas-engine coupled with a small dynamo, the two machines being mounted on a self-contained base and forming a neat little electric lighting set suitable for private houses. On the same space will be found an assortment of manhole-covers, valves, penstocks, and a useful automatic check-valve for preventing the flooding of basements.

Messrs. Beaven & Sons (Row S, No. 251) exhibit the "Laxnot" acetylene gas-generator, a compact apparatus, including purifier and stand, and suitable for small private houses. This is the only example of acetylene gas-plant at Olympia.

Refuse Destructors.

The Horsfall Destructor Company, of Leeds (bay No. 2, gallery) show several types of furnace which deserve the attention of architects. One of these is the "Cupola" destructor, a semi-portable furnace suitable for dealing with hospital refuse. Another is a model of the "Horsfall" sectional smoke-consuming furnace, the grate of which consists either of closely-spaced bars or of conically-perforated plates, according to the nature of the fuel, and forms the top of a trough divided longitudinally into several compartments, each fitted with a steam jet for forced draught. Those who are interested in the subject of refuse destruction on a larger scale should take the opportunity of inspecting the model "tub-feed" destructor, the simple centrifugal dust-catcher, and the self-contained clinker crushing and screening plant made by the Horsfall Destructor Company.

Messrs. Hughes & Stirling (Row B, No. 20, gallery) exhibit a model to scale of a "Sterling" destructor plant complete with steam-boiler, regenerator, flues, dust-collector, and chimney. The model also includes the building of the destructor-station, so as to make clear the method of handling the refuse by means of a travelling-crane and buckets. Thus the complete process of destruction is illustrated from the point of delivery to final disintegration in the furnaces.

Messrs. Meldrum Brothers, of Timperley (Row B, Nos. 22 and 23, gallery), in addition to actual examples of their patent coking stoker with silent forced draught and patent boiler furnace in two types, show models of their regenerative refuse destructors. It is quite reasonable that furnaces of large size should be represented by models, but we think it would have been good policy for Messrs. Meldrum to have included a full-sized specimen of their hospital type destructor

in an exhibition appealing specially to architects.

Messrs. Heenan & Froude, of Manchester (Row B, No. 26, gallery), exhibit a ½-in. scale model, representing a "Heenan" destructor-plant, a full-sized example of their patent furnace front, and one or two samples of welded hot-water boilers. The above-mentioned model and some samples of clinker slabs are the most interesting items on this stand from our point of view.

Hydraulic Appliances.

Mr. H. P. Vacher, of Winchester (Row Q, No. 227), has the distinction of being the only exhibitor of hydraulic-rams for water-raising purposes. These extremely useful appliances are shown in several sizes, and of two types—for ordinary service and for pumping. Those of the first class are exhibited in sizes from 1 in. to 4 in., capable of raising under average conditions from 100 gallons to 4,000 gallons of water per day of 24 hours. A 3-in. "Vulcan" compound or pumping ram represents the second class, the special advantage of which is that it can be actuated by a stream of impure water, and used to raise and discharge clean water only. Mr. Vacher further shows a neatly-made duplex water-turbine for electric-lighting, and two serviceable barrel-pumps, one of which is of the deep-well type.

Messrs. Duke & Ockenden (Row B, Nos. 12 and 13, gallery) devote attention to various specialties connected with small water supplies. Among these are a "Dando" self-regulating windmill on a short tower, and "Dando" pumps for windmills and trench-work. This is a stand whch building and engineering contractors will find of interest.

The "Safety" Water Elevator Company, of Dunstable (Row B, No. 1, gallery), show a form of bucket-pump which may be found useful in country districts for raising water from dug wells. It consists of a casing containing gear driven by a crank-handle and a rope carrying buckets, each fitted with a valve at the bottom. As each bucket arrives at the top the valve opens automatically and the water is discharged through a spout.

Messrs. Ham, Baker, & Co. (bay No. 19, gallery) make a very good display of hydraulic apparatus and fittings. Their automatic travelling and rotary-distributors for sewage filter-beds and sewer ventilating-shafts combine several good features, one of which is the application of a patent disinfecting-chamber to sewer-shafts, so as to render innocuous the gas which issues from the top. Contractors' pumps, hydrants, valves of various kinds, water-meters, and an electrical water-level indicator for tanks and reservoirs are among the remaining exhibits of this firm.

Disinfection Apparatus.

Messrs. J. Defries & Sons (Row B, No. 42, gallery) exhibit two types of disinfecting apparatus. The most prominent is an "Equifex" saturated steam disinfector, fitted with an automatic recording gauge, furnishing a diagram by which the medical superintendent, or other responsible officer of the institution where the apparatus is employed can see what has been the duration and efficiency of each operation during the day. In conjunction with the autographic gauge a device is now applied with the object of preventing the operation of the gauge until all air has been ejected from the interior of the chamber, thus providing a safeguard against inadequate treatment in a mixture of air and steam. The other disinfector exhibited by Messrs. Defries is a portable spray apparatus for disinfecting hospital wards and rooms generally by means of a germ-destroying chemical solution. On this stand may also be seen samples of the Pasteur-Chamberland filter and the Scurfield indicator for determining the percentage of carbon dioxide in air.

Air Propellers.

Apart from the electric fans mentioned in our Supplement of last week, the only air-propelling machinery in the exhibition is to be seen at the stand of Messrs. Matthews & Yates, of Manchester (bay No. 22). Here a "Cyclone" refuse-collecting apparatus is in operation for the removal of shavings from the planing-machine at work on the adjoining exhibit of Messrs. Becker & Co. Several sizes of "Cyclone" air-propellers, blowing and exhausting-fans, are shown, some with electric-motors, one direct-coupled to a small steam-engine, and others of the belt-driven type.

Drawing Office Specialties.

Messrs. Norton & Gregory (bay No. 1, gallery).—In addition to a selection of drawing and surveying instruments, this firm show two patterns of the "Perfect" drawing-table, the board of which can be adjusted to any angle or height (within reasonable limits), and is fitted with a patent T-square, leaving the left hand of the draughtsman perfectly free. The "Arcus" printing-frame for the reproduction of tracing is of novel form, consisting of a curved sheet of plate-glass, over which a canvas-cover is stretched for holding the tracing and sensitised paper. Any desired tension can be obtained by a simple device at one end of the frame in which the glass is mounted. The "Carriancut" holder for rolls of drawing and tracing paper or cloth is a valuable adjunct to the drawing office. Any required length of the paper can be drawn out and cut off simply by pulling the free end outwards and downwards and at the same time all curl is taken out from the material. Another exhibit on this stand, although not appertaining to the drawing-office, is of direct interest to architects. We refer to the "New Idea" spring-hinge for double-swing doors. The main feature of this hinge is that, being fixed to the door jamb instead of to the floor, sagging and the other drawbacks of floor-springs are obviated.

Messrs. B. J. Hall & Co. (Row B, No. 16, gallery) show drawing and surveying instruments, the "Perfect" drawing-table, with a new attachment, and the "Pluperfect" drawing-table, which has a counterweight instead of the gear employed in the "Perfect" table, the result being that the board can be adjusted more readily. Hall's electric copying machine in two patterns and Hall's new patent continuous copying machine taking blue prints of any length at the rate of 3 lineal feet per minute, are certainly the most interesting features of this exhibit.

Messrs. Vincent Brooks, Day, & Son (Row B, No. 40, gallery) illustrate their true-scale systems of photographic copying; and Messrs. Limmer & Co. (Row L, No. 185) exhibit a collection of Abney levels and clinometric rules for surveyors.

Contractors' and Public Service Vehicles.

The Bristol Wagon and Carriage Works Company (Row B, Nos. 6 and 7, gallery) show some strongly-built carts and vans suitable for builders, and an excellent ambulance-van.

Messrs. Constable & Son (bay No. 9, gallery).—On this space the visitor will find a balanced-tip open-top van designed for road refuse, but equally suitable for building contractors; one of Constable's patent dust-collecting vans, as used by the Slough Urban District Council, this vehicle having hinged cover-lids held open when required by patent fasteners, and the loading-rail at such a height that it can be reached without the aid of a ladder; and one of the street orderly trucks of the pattern used by the Westminster City Council.

Messrs. William Glover & Sons, of Warwick (wall space No. 155 and bay No. 14, gallery), exhibit a serviceable-looking spring-van, with improved axles and springs, built for contractors; two "Warwick" road-watering vans, a hand-watering cart, and a selection of street-orderly trucks. One of the watering-vans has a circular tank fitted between the wheels with sprinklers covering any width between 3 ft. and 22 ft., and with a flushing-head for gullies, which can be brought into play by the same lever controlling the sprinklers; the other van has a rectangular tank with the sprinklers behind the wheels, which is certainly the best position.

Messrs. T. Baker & Sons, of Compton (Row B, No. 43A, gallery), exhibit a road-watering van of good design capable of sprinkling any width up to 21 ft.; one of their "Albion" street-sweeping machines with improved gear for adjusting the position of the brush; a sanitary-tumbler cart with cranked axle; and samples of Hahnite, a preparation which, when added to water for road-sprinkling, has the effect of laying dust in a very effective manner.

Messrs. William Ball & Son, of Kettering (Row K, Nos. 179 and 180), have on view some strongly-made builders' hand-carts and a selection of grindstones mounted on cast-iron stands.

Mr. H. Blacknell, of Fleet (Row A, No. 37), has a good show of barrows and other builders' requisites.

Bricks, Building Blocks, and Paving.

The following are some exhibits which were not mentioned in our Supplement last week:—

Mr. Mark Gentry (Row B, No. 58).—Red-facing rubber and moulded bricks, and various samples of white and coloured enamelled bricks and salt-glazed bricks made by the Pioneer Glazed Brick Company, of Buxton, who are represented in London by Mr. Gentry.

Mr. Richard Trower, of Redhill (Row L, No. 183). — Red-facing and ornamental bricks, stock and wire-cut bricks, and samples of building-sand.

The Cavity Ventilating Building Block Syndicate (bay No. 2) show samples of Stidder's patent concrete building blocks, used for building walls in two vertical courses connected together by dovetailed blocks leaving a cavity 1 in. wide between the inner faces of the blocks, thus minimising the effects of temperature variations, and reducing sound transmission. This is a new departure in building construction which ought to interest many of our readers.

The British Mosaic Art Company (Row S, No. 244).—Examples of mosaic and terazzo-paving.

Messrs. J. A. King & Co. (Row D, No. 88), in addition to the specialties described last week, are exhibiting a novelty in the way of glazed bricks produced by facing any ordinary building brick with a pure white impermeable glaze which, as we can vouch by the results of tests made in our presence, cannot be stained by ink of different colours—a characteristic not possessed by one of the best-known glazed fireclay bricks made in the usual way and tested at the same time. Apart from the structural advantage of being able to use soft brick throughout the thickness of a wall that is required to present a glazed front, the saving should be something very considerable. We are informed that the process is being applied in the London district, and is suitable for the treatment of all other clay products as well as bricks.

Brick and Tile-making Machinery.

The Nuneaton Engineering Company (wall space No. 169) show a selection of Stanley's semi-plastic dust-brick machines and an ornamental paving-tile machine of generally similar construction. The main features of the machines are a shaped cam working on a roller fitted into the crosshead carrying plungers pressing into twin dies. Pressure is gradually applied, being slightly relieved during the process, to permit the escape of air and equal expansion of the material; finally the pressure increases to the required degree, giving an excellent brick or tile with hard and true arrises on both sides. The machinery on this stand is of good design and workmanship, and is to be seen in actual operation.

Mr. P. Bawdon (bay No. 9) exhibits one of his patent brick-moulding machines with pug-mill, suitable for any ordinary clay. This is a strongly-made and presumably not a very expensive machine, which may be found useful to those who do not wish to lay down costly brick-making plant. It is supplied for operation by horse or steam power as may be preferred.

Fire-escape Staircases.

Messrs. Wilmer & Sons (wall space Nos. 175 and 176) devote a large portion of their stand to fire-escape staircases designed for compliance with the requirements of the London County Council and other authorities. These staircases are built straight or spiral as may be necessary, the treads being formed of cast-iron gratings with or without risers of similar character.

The Building Acts Fire Escape Company (Messrs. J. A. King & Co.'s stand, Row D, No. 88), have fitted one of their "Bafeco" automatic trap-door fire-escapes, but (owing to lack of available space) without the ladder which forms an essential part of the apparatus. The deficiency, however, is made good by a series of models, showing the complete escape, with and without a ceiling trap in addition to the roof trap, fitted to suit different conditions and types of roof. Briefly

described, the apparatus comprises a trap-door with a counter-weight arranged so that by simply pulling a handle to release the locking-catch, the trap-door automatically opens, and at the same time a hinged ladder swings downward to the floor. The mechanism is so well balanced that it could be set in motion by a child, and the trap-door can be closed just as readily as it is opened, thus checking the draught always ascending towards the roof in the case of fire. The "Bafeco" escape has been designed specially to meet the requirements of the London Building Acts (Amendment Act), 1905, and, we are informed, has been approved for that purpose by all the District Surveyors of the metropolis.

A Novel Fire Extinguisher.

Messrs. Messer & Thorpe (Row H, No. 139) exhibit an ingenious arrangement consisting of a rectangular tank of suitable form for the reception of ten or more buckets fitting one into another. The tank is filled with water and each bucket is automatically held in the proper position, so that when it is lifted out it is sure to be full of water, however rapidly the buckets are removed from the tank. For dealing with any outbreak of fire in the initial stage this ought to be a very efficient extinguisher and far more sensible than the row of buckets still to be found in many buildings hung on a wall where they cannot be reached without the aid of a step-ladder. The great advantages of this simple apparatus are that it is always ready for use and that it contains nothing which can get out of order. The water tank is covered by a tightly-fitting lid and can be supplied galvanised, japanned, or cased in mahogany and other ornamental timber as may be most appropriate for factories, public buildings, or private houses.

Paint, Varnish, Oil, Etc.

Messrs. James Price & Son (Row C, No. 74) make a good display of their "Chezlui" enamels and washable distemper, varnishes, colours, and painters' requisites, as well as some sanitary fittings.

Messrs. Duggan, Neel, & McColm (Row N, No. 209) show examples of work covered with their new "Dodo" air-drying enamel drying with a beautifully smooth surface resembling that of the best coach work. To get the best results a layer of "Dodo undercoat" should be applied and carefully rubbed down. The enamel is only supplied in white, ivory-white, and cream, but can be coloured to any desired shade by admixture with Messrs. Duggan, Neel, & McColm's tube pigments. The "Dodo" flatting enamel, drying with a non-glossy egg-shell surface, is prepared in a great variety of tints and, like the other variety, is very elastic and can be applied as easily as ordinary paint. These enamels have good covering power and two coats suffice to give a good solid effect on bare wood.

The "Fillion" Company, of Brentford (Row R, No. 245), show three types of their Blanc Fillion distempers, Green's washable distemper, and dryers.

The Aerograph Company (Row G, No. 132) exhibit their apparatus for the mechanical application of oil paints and distempers, which are forced by air-pressure through a nozzle at the end of flexible tubing attached to the machine. The paint or other material can be laid upon flat surfaces with great facility, and applied in conjunction with stencils to decorative work. Examples of work done are displayed at this stand, where also the appliances mentioned are shown in operation.

Mr. H. R. Justice (Row R, No. 242A), besides Hayes' flexible metallic lathing-sheets for ceilings and partitions, exhibits a new medium, of which linseed-oil is the basis, giving remarkable flexibility to paints and varnish, as well as increased resistance to atmospheric action.

Price's Patent Candle Company (Row C, No. 65) have a well-arranged stand whereon may be found samples of oil and lubricants for machinery of all kinds; and Messrs. J. C. & J. Field also have a good selection of lubricating oils at Stand No. 217B in the gallery.

Messrs. Ripolin (Row G, special position No. 6), who make an enamel paint suitable for the treatment of timber, cement, plaster, and metals, utilise the interior of their stand, designed in the Empire style, to illustrate a pleasing colour scheme in Wedgwood green and white. In the front of the stand panels, doors, and framed work are used to display the effects obtainable by "gloss" and "flat" Ripolin. Apart from its claims to the attention of the decorative artist, Ripolin constitutes a durable and sanitary covering for the walls of buildings, and particularly of bathrooms, lavatories, hospital words, and similar apartments.

Glazing and Glass.

The Helliwell "Perfection" Glazing (Row B, No. 5, gallery) is shown on the stand of Mr. W. E. Farrer, and has not been included in the classified index to the official catalogue. This well-known system of glazing without putty or paint is one that fully deserves the attention of architects and engineers. The exhibit to which we now refer comprises a selection of models, making clear the distinctive features of the system, and one of the Helliwell "open-shut" louvre ventilators.

Messrs. Campbell & Christmas (Row A, No. 42) have a small but interesting stand containing numerous specimens of leaded glass work for domestic and ecclesiastical buildings, most of the designs being new and quite in accordance with modern taste. One good structural feature we noticed was the use of steel-core lead, dispensing with the use of the saddle-bar if desired.

It should here be mentioned that all the leaded glass panels in the doors exhibited by Messrs. Stavers & Stavers (Row E, No. 97), as well as the brass-door furniture, were supplied by Messrs. Nichols & Clarke, all this work being in good taste and apparently of inexpensive character.

Plaster.

The Gypsum Mines, Ltd. (Row G, No. 123), whose exhibit was noticed in our Supplement under the head of "Building and Paving Stones," ought also to be mentioned as the manufacturers of "Sirapite," a gypsum cement produced at their Sussex and Derbyshire works, and valuable for its fire-resisting and hygienic properties, great strength, and adhesiveness. Besides samples of this and other plasters in the form of powder, the visitor may see at this stand examples of Sirapite plastering on brickwork, wood-lathing, and metal-lathing of various kinds, and of Sirapite ceiling work with cornices in the forms of fine and coarse plasters. Keene's Parian, and Italian fine plaster are among the specialties of the Gypsum Mines, Ltd., the quality of the last-mentioned variety being admirably illustrated by some casts of figures included among the exhibits.

Miscellaneous.

Medway's Safety Lift and Elevator Company (Row G, No. 119) show in operation one of their push-button electric service lifts, also made for passenger service, with compactly-arranged gearing which can be placed either above or below the lift. This is a very neat and convenient form of lift, as the cage can be sent from any one floor to any other floor of a building by pressing the corresponding button in a plate fixed to the framing on each story. The exhibit also includes one of Medway's latest direct-coupled passenger lift gears, the special features of which are noiseless operation and a braking arrangement permitting the lift to be stopped at the dead level of any floor; an electric friction hoist, adapted for builders' use and all classes of work, a noteworthy feature being the wrought-iron bed-plate to prevent breakage in case of rough usage; and a silent self-sustaining dinner lift.

The Grooved Wall Paper Company (Row A, No. 39) show samples of wall paper whose selvage is prepared by a machine (not exhibited as erroneously suggested in the classified index to the official catalogue) so that it can be removed without the use of scissors, leaving a straight, undercut, bevelled edge suitable for a butt joint.

Messrs. Arthur L. Gibson & Co. (Row O, No. 214) have an entirely new type of electrically-heated hot-water radiator (made by Messrs. Donnison, Sillem, & Co.) which is very convenient for people whose premises are wired for electric light and wish to warm one or two rooms without going to the expense of installing a hot-water boiler and the necessary circulation pipes. The "Phœnix" radiator, as the apparatus is termed, consists of a central water well in which is an electric heating coil, and on either side of the well there are four cast-iron radiator sections through which hot water circulates in the usual manner. Any number of radiator sections can be fitted in connexion with the heater providing the surface is not too great for the capacity of the latter, and a very efficient alternative form of the apparatus is one with pressed wrought-iron radiator loops, which are very rapidly heated. Of course, to get the most economical results the electric radiator should be wired from a separate meter furnishing current at power-rates.

In the first bay of what is called the "Surveyor Section," Messrs. Norton & Gregory show their sun-printing frames and patent drawing-boards, etc., together with what they call the "New Idea" spring hinge for double-action swing-doors. The hinge is fitted to the jamb and stile of the door, and appears to be simply and easily regulated.

Messrs. R. O. Meyer (No. 5) exhibit some varieties of the "Strebel" sectional heating-apparatus boilers for low-pressure hot-water or steam. The sections are oval in shape, and are connected with waterways at the top and bottom. The grate is cast on to the sections at about half the height of the boiler, and the products of combustion pass up to the top of the boiler and then down a series of flues in the sides of the sections. The boilers are suitable for all purposes, and especially where hard water or water containing matters in suspension is used. The boilers are covered with asbestos and sheet-steel in order to prevent loss of heat by radiation.

The Ames-Crosta Sanitary Engineering Company (Nottingham) exhibit working models of their elevator for automatically lifting the detritus from detritus chambers, etc., and loading it into wagons, and of their "Simplex" automatic revolving sewage distributor as applied to bacteria-beds. They also show the Ames' patent fixed spray in operation for sprinkling sewage on to percolating filters. Among the other exhibits of the firm are tiles for the floors of bacteria-beds, the Ames' patent "Perfectseal" drain-pipe joint (a cement joint between rings of bitumen), manhole covers, and other drainage fittings.

Mr. Frank Keep (No. 11) shows a number of samples of filtering material for sewage purification, and also one of the Septic Tank Syndicate's domestic sewage apparatus. This is a wrought-iron septic tank with overflow discharging on to a tipper at the top of a second wrought-iron tank containing a series of expanded metal trays filled with coke after the manner first suggested (we believe) by Mr. Scott-Moncrieff. The sewage passes through the trays in succession, and is discharged from the bottom of the tank through the outlet drain.

Messrs. Adamsez have an interesting exhibit of sanitary fittings and glazed ware at bay No. 13. Their new "Oponwa" lavatories have the overflow in one corner of the basin at the back; in fact, it takes the place of one of the usual soap-trays. This overflow is circular, and has a weir inlet from the basin, and is continued downwards straight to the trap so that it can be easily cleaned. The waste outlet, which is fitted with an ordinary plug, is placed to one side of the basin near the overflow, and discharges by way of a pottery conduit into the overflow. They also exhibit some very good latrines and urinals, and their patent "Hygest" water-closet seats, which are made from a composition of a wood-like nature, said to be practically as hard as the ware. Their "Helios" sink has a draining ledge along the back which forms a clean rest for brushes, soap, etc. Their "Krator" fire has the upper part of the fire-brick back made with a broad flange around for building into the brickwork, so that it is supported quite clear of the lower part of the back; the latter can therefore be easily removed and renewed without interfering with the upper part. Mention may also be made of their self-contained earth-closets, which are made entirely of galvanised iron, with the exception of the wood seat.

The Candy Filter Company (No. 18) exhibit illustrations and models of the Candy apparatus for filtering water for

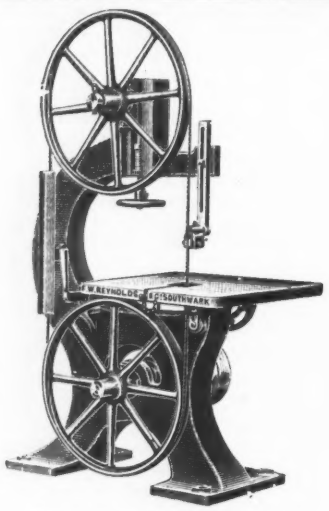


Fig. 1. Band-saw Machine.

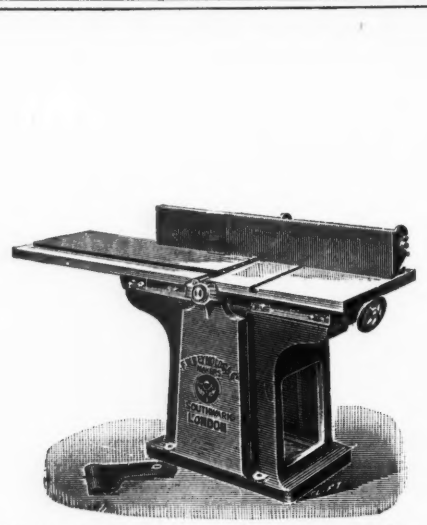


Fig. 2. Planing, Jointing, and Trying-up Machine.

Fig. 3. Chain Mortising Machine.

Wood-working Machines by Messrs. F. W. Reynolds & Co. in the Building Trades Exhibition.

public supplies, and at the same stand the Patent Automatic Sewage Distributors show the Candy-Whittaker buoyant sewage-distributors for sprinkling sewage over circular or polygonal filters. They also show the Candy-Whittaker patent automatic sewage-screen, which is fitted with a radial sweeping-arm. Among the other exhibits are V-shaped ventilation and drainage tiles for the floors of sewage filters, locking-bricks for the walls of circular beds, sewage siphons, and other fittings.

Mr. Walter C. Candy (Row N, Nos. 207 and 209) has two novelties which are worthy of notice in addition to the other goods on his stand. One of these is the "Wallace" overhead inlet closet, having a bend moulded with the rest of the pan so that the down pipe from the supply cistern can be led into the socket without the usual troublesome and costly bend. The other novelty is a sink-discharge bend obviating the splashing and risk of flooding attending the use of a straight discharge outlet.

Messrs. Millars' Karri and Jarrah Company exhibit close and open pale fencing of jarrah, and also a greenhouse, and other examples of joinery.

The Webb Lamp Company (No. 27) exhibit their system of sewer ventilation, in which a gas-lamp is utilised for creating an up-draught in the extract shaft, and also for consuming sewer gases. Their "London" patent ventilator for hospitals is of the hopper type with a brass frame and fine gauze panels to keep out flies, etc. Other exhibits of the firm are Webb's patent intensifying gas-burner and incandescent mantles, which are particularly well adapted for street lighting.

Messrs. Notley & Taylor (No. 3) have an interesting little exhibit of what they call the "Self-flanching chimney-pots." These are made with wide flanges around at about half their height, so that when the pots are placed in position the flanges cover the brick-work on the top of the chimney. Different kinds of tops are made for fitting on to the dwarf flange-pieces.

Mr. W. E. Farrer (Birmingham) exhibits, at No. 5, a full-size automatic sewage distributor suitable for country houses. This consists of a tipper extending across the full width of the filter-bed, and arranged so that the overflow which enters it from the septic tank is discharged alternately over the two halves of the filter. It is a very simple apparatus, and cannot well get out of order. He also shows some interesting disc-valves and other sewerage ironwork, and specimens of Helliwell's patent roof glazing and "Open-shut" louvre ventilator.

The Economic Fencing Company (No. 3) exhibit the "Peignon" chestnut pale fencing, some of which is of the close kind with cleft pales, while other specimens consist of rough pales connected with galvanised wire. The fencing can be packed in rolls, and is easily fixed to posts in the usual way.

Messrs. T. W. Palmer and Co. (Merton), at No. 10, show the "Victoria" cleft chestnut paling, which consists of rough pales connected with galvanised wire. They also show different varieties of wrought-iron fencing, garden bordering, and portable steel-wire fencing. The last is so made that it can be packed in rolls.

Mr. W. Cooper (Manchester), at No. 5A, exhibits a number of chimney-pots, the special feature of which is a copper disc supported over the central tube, but concealed from view by an outer and larger tube.

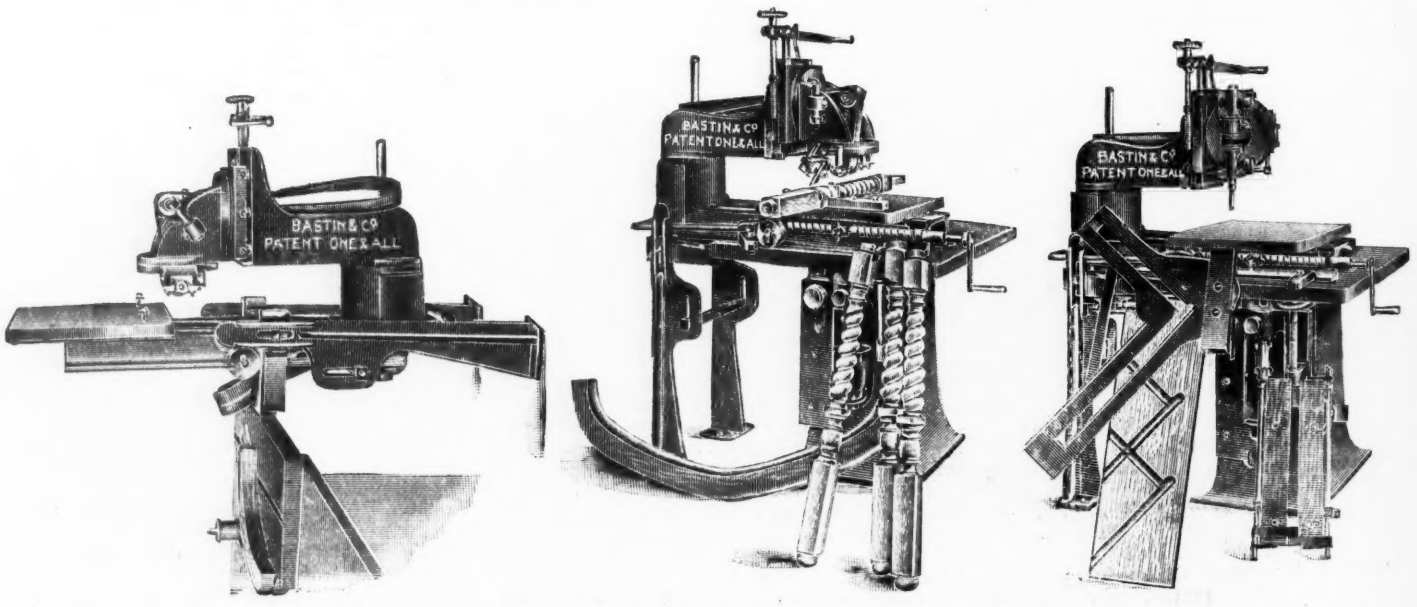
Messrs. Cakebread, Robey, & Co. (No. 10A) show a variety of drain-cleansing and chimney-sweeping tools, in addition to drain-rods made of malacca cane fitted with ordinary and special joints. They also show spiral wire drain-rods, which have the advantage of being easily bent to pass through bends, traps, etc. Smoke machines, drain-plugs and apparatus are also shown.

Messrs. John Harrison & Co. exhibit garden-seats, greenhouses, etc., and the Petrolite safety-lamps are shown on another stall. The special feature of these is that a perforated block of absorbent stone is placed in the receiver and saturated with a certain quantity of petrol. The vapour from this is drawn through the tube to the burner and mixed with air, a mantle of the incandescent type being used, as in the Welsbach and other systems of gas lighting. The lamp certainly gives a very good light, and if it is knocked over there is no explosion, but the light simply goes out.

Messrs. J. B. Hall & Co. (No. 16) exhibit different kinds of copying apparatus for drawings, and some ingenious drawing-tables, book-cases, cabinets, etc., for architects' use.

The Rubite Sanitary Pipe Company (No. 24) show their butt-ended stoneware pipes jointed with collars of rubite, which are formed by means of cast-iron moulds; and at the next stand Messrs. Sutton & Co. (Ashby-de-la-Zouch) have an exhibit of stoneware drain-pipes, gullies, traps, etc. Some of the pipes have a simple self-centring joint.

We give illustrations of three of the wood-working machines of Messrs. F. W. Reynolds & Co., the blocks of which did not arrive in time for insertion with the notice of them in the Supplement in our last issue; and also of Messrs. Bastin & Co.'s "One & All" machines, of which illustrations also reached us only this week.



Machines by Messrs. Bastin & Co. in the Building Trades Exhibition.

At No. 28 armoured and unarmoured concrete tubes, both circular and elliptical, are shown by Messrs. John Ellis & Sons, of Leicester.

Messrs. George Jennings (No. 29A) have a good display of fittings for sewage purification, including revolving sprinkler centres for sewage filters up to 140 ft. in diameter. They also show their patent gauging apparatus for sewage or water filters, and their floor tiles for ventilating and draining percolating filters, etc.

Messrs. D. Wilkinson & Co. (No. 31) show their "Turbine" grating, which is fitted with a wheel or turbine to discharge the grit into the catchpit and prevent the choking of sewers.

Messrs. George Waller & Son (No. 34) show sewerage ironwork of various kinds, including manhole covers, penstocks, valves, etc., and also a shingle bin for use in streets.

At No. 28 Messrs. Burn Brothers have a very interesting display of cast-iron drain-pipes, soil-pipes, and fittings, together with drain-testing and clearing appliances, manhole covers, etc. The soil-pipe fittings include bends and junctions of nearly every kind, many of them being fitted with access doors.

At No. 39 Messrs. Winkle & Co (Stoke-on-Trent) exhibit a porcelain-enamelled fire-clay bath glazed inside and outside, an oval lavatory on a central pedestal, constant-stream lavatories for schools, water-closets, sinks, urinals, and other sanitary fittings.

Messrs. Vincent Brooks, Day, & Son (No. 40) show their true-scale method of photo-copying; and at No. 41 Messrs. Yarrow & Co. (Bolton) show the Yarrow patent jointed pipe, in which the spigot end has a collar about 3 in. from the end. The collar and socket are so arranged that two hook-joints are formed when the pipes are placed together, and the annular space between them is then run with Portland cement.

Mr. Cole A. Adams writes to say that the work done under him by Messrs. Elliott & Co. (mentioned at page 17 of our Supplement last week) should have been described as at "Gaddesden Place, near Hemel Hempstead."

Fifty Years Ago.

FROM THE *Builder* OF APRIL 18, 1857.

STRIKE AND INTIMIDATION.

AT the Westminster Police-court, on the 8th inst., three labourers who had been employed by Mr. Freake, at Prince's-gate and Exhibition-road, but had turned out, being dissatisfied with the amount of their wages (3s. a day), and demanding 4d. more, were charged with using threatening and intimidating language towards other labourers who had agreed with Mr. Freake for the wages refused by the defendants. After hearing the evidence, the magistrate sentenced the three defendants to three months' imprisonment each, with hard labour, and announced that if there was any further interference with the men employed by Mr. Freake, he would impose the full penalty on the offenders.

*** It appears that at this date "peacefully persuading" was not recognised by the law. *Nous avons changé tout cela.*—ED.

Illustrations.

ILLUSTRATIONS OF WESTMINSTER CATHEDRAL.

FINDING that Mr. J. A. Marshall, who was announced to read a paper on Westminster Cathedral last week at the Architectural Association, had various plans and constructional drawings of the building, which he kindly offered to lend us, we at once decided to devote the whole of our plates this week to the illustration of the subject of Mr. Marshall's paper, printed in full on another page.

The geometrical drawings are all lent by Mr. Marshall: the view of the interior is from a photograph which we had specially taken for this issue.

Architectural Societies.

NORTHERN ARCHITECTURAL ASSOCIATION.—The members of the Northern Architectural Association held their first outdoor meeting of the season on the 13th inst. About sixty members travelled to Sunderland, where they visited the Wear Commissioners' new offices, the new police building and fire-station, and the new Empire Music-hall. The visitors were shown over the first-named building by Mr. Hall (Messrs. Henderson & Hall), and over the others by Mr. W. Milburn (Messrs. W. & T. R. Milburn), who were the architects in each instance.

SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.—The annual general meeting of this Society was held on Thursday evening last week in the Lecture-hall of the Literary and Philosophical Society, Leopold-street. Mr. E. Holmes presided. Mr. T. H. Robinson was elected an Associate member. The Hon. Treasurer's statement of accounts, and the report of the Council were read. These showed that the financial position of the society was satisfactory, and that there had been a slight increase in the membership. The report drew attention to numerous matters of interest to members of the profession, amongst which may be mentioned the Model Cottage Exhibition to be held this year at High Wincobank, and the laying-out of Fitzalan-square, a scheme for the architectural treatment of which was prepared by the Council of the Society, and for which the City Council has expressed its thanks. Mr. J. R. Truelove was awarded the prize of 5*l.* 5s. for measured drawings, subject to the usual conditions. The ballot for officers resulted as follows:—President, Councillor W. C. Fenton; Vice-President, Mr. W. J. Hale; Hon. Treasurer, Mr. F. Fowler; Hon. Secretary, Mr. J. R. Wigfull; Council, Messrs. C. B. Flockton, C. Gibson, J. B. Mitchell-Withers, H. L. Paterson, A. E. Turnell, A. F. Watson, W. G. Buck, C. F. Innocent, and H. J. Potter. At the conclusion of the business meeting Messrs. A. W. S. Cross and G. Hubbard, of London, read short papers dealing with "The Revision of the Charter of the Royal Institute of British Architects." The papers were followed by a discussion, in which the feeling was expressed that these proposals, the result of compromise, left the main subject, *i.e.*, compulsory registration of architects, much in the same position as before, and that the supporters of this measure should not relax their efforts until their object was attained.

GLASGOW INSTITUTE OF ARCHITECTS.—A special general meeting of the Glasgow Institute of Architects was held on the 10th inst., Mr. James M. Monro, F.R.I.B.A., President, in the chair. The following were elected members of the Institute, viz.:—Messrs. James Davidson, Academy-street, Coatbridge; George Simpson, 233, St. Vincent-street, Glasgow; and John Archibald Wilson, 92, Bath-street, Glasgow. The Secretary reported that the Council had suggested the name of Mr. Monro for the position of external examiner at the forthcoming examinations of the Glasgow School of Architecture, in accordance with the desire of the Royal Institute of British Architects that an external examiner should be appointed from this Institute. It was also reported that the Council had written the Bristol Society of Architects, approving of a proposal of that society that presidents of all allied societies should, *ex officio*, be members of the Council of the Royal Institute of British Architects. The President referred to the liability of architects under the Workmen's Compensation Act, 1906, in the case of accidents happening to clerks of works, architectural pupils, etc., and stated that the Royal Institute had obtained an opinion from their legal advisers on the subject; but, as the opinion was not final, the matter had been again referred to the solicitors.

ABERDEEN SOCIETY OF ARCHITECTS.—The annual report of the Aberdeen Society of Architects for the past year contains the following passage:—In November the Council had under consideration a letter from the Aberdeen Branch of the Amalgamated Society of House and Ship Painters with reference to the prevalence of "scamping" in the painter work trade, and suggesting a conference with the Society to discuss the matter. To this the Council replied, agreeing to the proposal, provided the Aberdeen Master Painters' Association was also to be represented at the meeting. At the same time, the Council communicated on the subject with the Masters' Association, and from that body a letter was received, stating that the masters had already done all they could in the matter, and did not see that the conference which the men proposed could do any good. The Council accordingly communicated again with the men's Association, indicating the attitude of the masters towards the proposal, and stating that, in the opinion of the Council, no good purpose would be served by a conference at which the Masters' Association was not represented. Here, for the present, the matter rests.

Engineering Societies.

IRON AND STEEL INSTITUTE.—At their annual meeting on May 9-10, at the premises of the Institution of Civil Engineers, the chair will be taken by the President-elect, Sir Hugh Bell, and the Bessemer gold medal for this year will be presented to Mr. Johan August Brinell, of Stockholm, who has made advanced researches into changes of its texture induced by the heating and cooling of steel, and tests for determining the hardness of metals. The autumn meeting of the Institute will be held, by invitation, in Vienna.

INSTITUTION OF MECHANICAL ENGINEERS.—The newly-elected officers for the current session are Mr. T. Hurry Riches, President; Mr. H. Chapman and Mr. E. P. Ellington, Vice-Presidents; and Sir Benjamin Baker, Sir John Wolfe Barry, and others, as members of Council. Mr. H. A. Humphrey has won the Willans premium with his paper upon "Large Gas-engines."

Competition.

SUNDERLAND BRANCH LIBRARIES.—At the monthly meeting of the Sunderland Town Council, held on the 10th inst., the result of the competitive plans for branch libraries was announced. Messrs. Davidson & Cratney, of 22, Fawcett-street, Sunderland, and also of Newcastle, have won both first and second positions for both Church-street, Monkwearmouth, and Villette-road. Subsequently, as the result of a discussion, it was suggested that the committee should carefully consider whether this firm had fulfilled the conditions of the competition, which was confined to local architects.

BOOKS RECEIVED.

SURVEYING CARPENTER AND BUILDER. Technical Series: No. 17. (John Dicks Press. 6d.)

GRAPHICAL HANDBOOK FOR REINFORCED CONCRETE DESIGN. By John Hawkesworth, C.E. (Crosby Lockwood & Son.)

AGGLUTINANTS OF ALL KINDS FOR ALL PURPOSES. By H. C. Standage. (Archibald Constable & Co. 6s.)

GLUES AND GELATINE. By R. Livingston Fernbach. (Archibald Constable & Co. 10s. 6d.)

"PROPOSED COUNTY HALL AND BRIDGE."—The title on the plate of this design published in our last issue, would in itself have conveyed the erroneous idea that the "proposal" itself was that of Mr. Twining, the author of the design and of the drawing, whereas the proposal was not his, only the architectural form. We duly explained this in the text, but it should no doubt have been conveyed in the title on the plate. The fact is that as we merely published the drawing as a fine architectural one which had been exhibited at the Royal Academy, we naturally took the title from the Academy Catalogue. It was only illustrated for the sake of Mr. Twining's architectural conception; the mere proposal to build the County Hall on a bridge we should not have illustrated as such, as we considered it absurd and unpractical.

Correspondence.

OFFERS OF COMMISSIONS BY TRADESMEN.

SIR,—Referring to the extract from the *Builder* of "Fifty Years Ago" in your last issue as to the offer of "discounts" or commissions to architects, it is satisfactory to know that the recent Corrupt Practice Act has dealt a deadly blow at such temptations. There is no doubt the giver and receiver of such "discount" would render themselves liable to serious consequences. LEX.

*** We were not quite sure how far the new Act would really touch this subject. But the writer of the above is an experienced lawyer, and we have no doubt that he is right.—ED.

HOTEL PLANNING.

SIR,—In the interesting paper by Mr. Hamp, and in the discussion also, I miss two points, viz. :—

(1) Any details of those arrangements, from the manager's point of view, which conduce to quick service and the economisation of staff.

(2) Any consideration of the capital involved in relation to the accommodation, and to the probable business results.

E. R. ROBSON, F.R.I.B.A.

INCREASED CHARGES BY THE WATER BOARD.

SIR,—If you can find space for this letter in the *Builder* it may be the means of letting the trade know something which my firm have had to pay for, not through inexperience or carelessness, but simply through the methods of a public body.

At the latter end of March I gave notice to the Metropolitan Water Board stating that some structural alterations were about to be started near Bond-street, and gave the estimated cost of the work, *i.e.*, 2,900*l.*, and also pointed out that the bulk of the work was joinery, and, therefore, would require no water at all. On April 4, to my astonishment, a charge was demanded of 10*l.* 3s. for the small amount of water the work would require, and upon my remonstrating and pointing out that in January, 1906, only 9*l.* 5s. was charged for a job estimated to cost 3,500*l.*, was told that "The difference in the proportion arises from the fact that the Board has instituted a new and uniform scale of charges which *came into force on the 1st inst.*"

It will, therefore, be seen that in the future we must allow as much as 7s. per cent (net cost) to cover the charge for water used in building operations. In the days of the old water companies the rate was 5s. per cent., and in these times of cutting competition it is a serious item to have to face such increases as the above without a word of warning or preparation.

O. C. PIPE.

RIDDRIE ESTATE COMPETITION, CORPORATION OF GLASGOW.

SIR,—Does not this matter bid fair to add to the long catalogue of unsatisfactory competitions ?

The Corporation advertised for building schemes for laying out the Riddrie Estate, and for designs for three, four and five roomed tenements thereon. These were to be sent in on December 12 last, but the time was extended to January 12. This extension was notified as late as November 27, when most competitors would have nearly or quite finished. It is now past April 12, or more than three months after the deferred delivery, and nothing seems to be known or heard of any result.

It is generally understood that the Glasgow Corporation officials are averse to this competition—certainly they have not done much to give competitors information or to secure a satisfactory issue.

The members of the Corporation will do well to look into this business and bring it to as speedy and just a conclusion as possible.

COMPETITOR.

NEW SCHOOL, NEWTOWN.—A new school, built from the plans of Mr. D. Pugh Jones, the County Architect, has been opened at Newtown, in the Rhymney Valley. The contractors were Messrs. Davies & Francis, Hengoed. The building provides for the accommodation of 150 mixed and infant scholars.

COUNCIL SCHOOLS, BUXTON.—New Council schools were opened on the 8th inst. in Kent Bank-road, Buxton, to accommodate 200 senior and the like number of junior boys. The structure was designed by Mr. Charles Swain, architect, of Greenmoor, Buxton, and the contractors were Messrs. R. Weston & Son, of Derby.

The Student's Column.

ELECTRIC LIGHTING AND HEATING.—XV.

Transmission of Power—Thury System—Polyphase Systems—The Coronae Round the Mains—Conversion of Two-phase to Three-phase.

TRANSMISSION OF POWER.—The ease with which power can be transmitted even over considerable distances by electrical methods is rapidly modifying everyday practice in connexion with the generation of electrical power. About thirty years ago Lord Kelvin suggested that the Niagara Falls might be "harnessed," and the power uselessly expended be employed for lighting and heating. At the time the suggestion was considered to be outside the range of practical engineering. Engineers are now ready to utilise all the hydraulic power that can be got from the Falls, and legislation has to be passed to restrain them from utterly ruining what has for long been regarded as one of the most wonderful sights in the world.

In the neighbourhood of London, and even in London itself, very large power-stations have been, and are being, erected. Many of them are situated on the banks of the Thames, or on canals, so that coal can be conveyed cheaply to them. The modern tendency, however, is to remove these unsightly buildings to greater distances from industrial centres and nearer to the coal-mining districts. The power will be generated at very high pressures, and distributed to substations where the pressure will be reduced and distributed to consumers in a similar manner to the present method, the old systems of underground mains being used. As there is no need to convey coal to, or ashes from, these substations, and as the running machinery used will be practically noiseless, there is no reason why they should not be built even in main streets in sites which theory indicates as the most economical. As we pointed out in the first chapter, a great—if not the greatest—advantage in the general use of electricity would be the abolition of the unsightly rows of chimney-pots disfiguring all London houses, and the smoke from which makes roof gardens uninhabitable at certain times of the day, or when the wind is in certain directions.

We shall now consider some of the problems which arise in connexion with the underground mains and overhead wires used for the transmission of electrical power over considerable distances. Let us suppose that the electrical power is generated at a pressure of E volts, and that it has to be transmitted at this pressure to the substation, where it will be transformed to a lower pressure and distributed. Let us suppose also that the pressure at which the power is received at the distributing-station is E, that W is the power transmitted, and R_1 the resistance of each main. We shall first consider the case when direct-current dynamos are employed.

Let C be the current in each main. The power leaving the generating-station will be CE watts, and the power W received at the distributing-station will be CE_1 watts. The efficiency of the transmission, therefore, will be CE_1/CE that is, E_1/E. Now the voltage drop in the mains is $E - E_1$, and this equals $2R_1C$. Hence

$$E - E_1 = 2R_1C \quad \ldots\ldots\ldots (1)$$

and, therefore, $CE = CE_1 + 2R_1C^2$,

$$\text{or } CE = W + 2R_1C^2. \quad \ldots (2).$$

Now, for a given power W transmitted, and for given values of E and R_1, there are two possible values of C, for (2) is a quadratic equation. Solving this equation we find that the two values C_1 and C_2 of the current are given by

$$C_1 = (1/4R_1)\,[E + (E^2 - 8R_1W)^{1/2}],$$

and $$C_2 = (1/4R_1)\,[E - (E^2 - 8R_1W)^{1/2}].$$

When the current is C_1 we get from (1) that the efficiency η_1 is given by

$$\eta_1 = E_1/E = 1 - 2R_1C_1/E.$$

Similarly the efficiency η_2 when the current is C_2 is given by

$$\eta_2 = 1 - 2R_1C_2/E.$$

It follows readily by elementary algebra, as first pointed out by Professor Perry, that

$$\eta_1 + \eta_2 = 1.$$

If η_1 and η_2 are equal, then each must equal a half, and the efficiency is 50 per cent. If, however, they be unequal, one of them must be greater than a half, and the other less than a half. It follows, therefore, that the efficiency of the transmission of electrical power by overhead wires or underground mains need never be less than 50 per cent.

When the load at the distributing-station is small, the voltage drop $E - E_1$, which equals $E(1 - \eta)$, is small also. The efficiency of the transmission is therefore high. As the load increases the voltage drop $E(1 - \eta)$ increases, and therefore η continually diminishes. We see that the lighter the load the higher is the efficiency of the transmission. Again by (2) the power W transmitted is given by

$$W = CE - 2R_1C^2.$$
$$= E^2/8R_1 - [(E/\sqrt{8R_1}) - C\sqrt{2R_1}]^2$$

The greatest possible value of W occurs when the term raised to the second power vanishes, that is when $C = E/4R_1$. In this case the power transmitted equals $E^2/8R_1$. If the current be greater than $E/4R_1$, both the power transmitted and the efficiency are less than $\frac{1}{2}$, when it equals $E/4R_1$, and thus nothing is ever gained by allowing the currents in the mains to have values greater than the current at which the maximum power is transmitted.

Let us suppose that the voltage at which the power is generated is 10,000, and that the resistance of each main is 50 ohms. In this case the maximum value of the power that can be distributed is $10{,}000^2/(8 \times 50)$, that is, 250 kilowatts, and the current at this load would be 50 amperes. The power lost in heating the mains would be equal to that transmitted, and thus the efficiency of the transmission would only be 50 per cent. In order to obtain a 90 per cent. efficiency, E_1/E must equal 0·9, and thus E_1 would equal 9,000 volts. By (1) we see that the current equals $(E - E_1)/2R$, and this equals 10 amperes. Hence, when the efficiency is 90 per cent., the power transmitted is 90 kilowatts. It is theoretically possible also to transmit the same amount of power at an efficiency of 10 per cent., the current being 90 amperes. But as there would be no reason to work with this large current and low voltage in practice, we see why the smaller current and high voltage are always used, and why, therefore, the efficiency of a power transmission scheme is always greater than 50 per cent.

Thury System.—In the high-voltage system, devised and perfected by M. Thury, of Geneva, direct current only is used, and there is only one overhead conductor. At the power-station direct-current dynamos are connected in series with one another, the voltage of each machine being 3 or 4 kilovolts. Similarly the motors of the motor-generator sets at the distributing-stations are connected in series. The overhead conductor leaving the power-station is erected so as to link the towns which have to be supplied with power together by one large loop, the potential of the conductor leaving a town being less than when it entered it by the voltage required for the motors in the local substation.

The line from Moutiers, in Savoy, to Lyons, which is 125 miles long, is a well-known example of this system. The power transmitted to the distributing-station in the centre of Lyons is 3,000 kilowatts, and the current in the line, which is always the same, is 75 amperes. The voltage at the generating-station varies with the load, and the motors run at constant speed, driving 600-volt direct-current tramway generators. The generators at Moutiers give a voltage of 3,500 at full load. The armatures are mounted in sets of four, giving 14,000 volts, and, as four sets are used simultaneously, the maximum voltage is 56,000. The loss in heating the overhead conductor, which is about $\frac{1}{4}$ in. in diameter, is about 10 per cent. of the maximum load, but as the water-power required to drive the turbines is abundant, this is no practical drawback.

The weak point of the system is the large number of high-tension commutators required, and the necessity of adopting very special methods of insulating the motors not only from earth, but also between the earth and the attendants who have to touch the machines. Experiments were carried out to

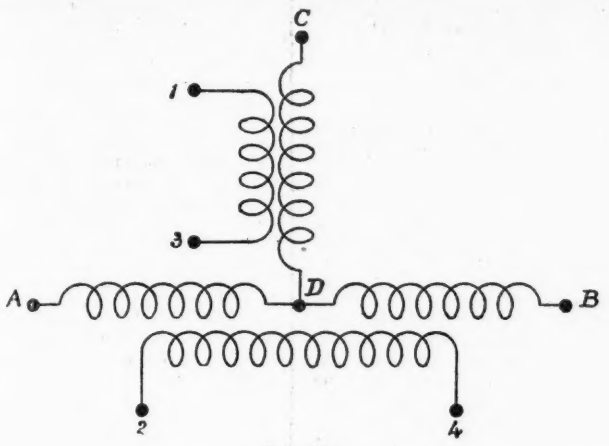


Fig. 28.

see whether it was possible to use the earth as a return conductor. The results showed that the earth currents would probably do serious electrolytic damage to gas and water pipes, and so it was abandoned. The electric power is conveyed to the centre of the city by underground mains three miles long, and as these mains have successfully withstood the working voltage for several years it is probably that even higher pressures will be used in this system in the immediate future.

Polyphase Systems.—We shall now compare the efficiency of a direct-current and a three-phase system when the same amount of copper is used in the mains in the two cases. If R_1 be the resistance of each of the direct-current mains, $3R_1/2$ will be the resistance of each of the mains of the three-phase system. We shall suppose that the power W transmitted to the distributing-station and the voltage between the mains is the same in the two cases. If A_1 denote the current in each of the three-phase mains, we have

$$W = \sqrt{3}\ VA_1 \cos\phi = VA,$$

where $\cos\phi$ is the power factor of the load.

Hence $A = \sqrt{3}A_1 \cos\phi$. The efficiency of the single-phase transmission is given by $W/(W + 2R_1A^2)$, and the efficiency of the three-phase transmission is $W/[W + 3\ (3R_1/2)\ A_1^2]$, that is, $W/[W + 1{\cdot}5\ (1/\cos^2\phi)\ A^2]$. We see, therefore, that if $1{\cdot}5/\cos^2\phi$ is less than 2, that is, if $\cos\phi$ be greater than 0·87 the efficiency of the *transmission* of the polyphase currents will be the higher. It must be remembered, however, that polyphase generators and motors are cheaper and require much less attention than direct current machines. The ease also with which the voltage can be altered by means of stationary transformers is a great point in favour of polyphase systems.

The Coronæ Round the Mains.—When the potential difference is very high, each main is seen surrounded by a faintly-luminous enveloping cloud of a bluish colour, which apparently does not touch the conductor it envelops. This phosphorescent cloud is called the corona. As the pressure between the mains is increased, short violet streamers are seen issuing outwards from the corona, the space immediately outside the corona being the seat of great electrical activity. At very high pressures the streamers are longer, and a hissing sound is heard. Finally, the air gets broken down at some point, and an arc is established. It is found that when the pressure gets so high that coronæ are generated round the conductors, the losses in the line are appreciably increased, and the smell of the ozone formed can be detected to considerable distances from the line.

Conversion of Two-phase to Three-phase.—An interesting method, due to C. F. Scott, of converting a two-phase into a three-phase supply is illustrated in Fig. 28. The coil CD is the secondary of a transformer, of which the coil joining 1 and 3 is the primary. Similarly, ADB is the secondary of a transformer, of which the coil joining 2 and 4 is the primary. If we join 1, 2, 3, and 4 to the four mains of a two-phase system, we can take three-phase currents from the terminals A, B, and C. Conversely, by joining A, B, and C to a three-phase system of supply, we can get two-phase currents from 1, 2, 3, and 4. It will be seen, therefore, that the conversion of two-phase to three-phase, or conversely, is a simple matter when a transformer of this type is employed.

One of the earliest large power-stations in the world is the one situated on the American side of the Niagara Falls. An interesting method is employed at this station for the conveyance of the power obtained from the Falls to the tramcars in the City of Buffalo, eighteen miles away. The water turbines drive two-phase dynamos which generate electric power at a pressure of 2,000 volts; it is then transformed into three-phase current at a pressure of 11,000 volts, and transmitted by overhead wires to Buffalo. It is then transformed again into low-pressure two-phase currents, and used to drive two-phase rotary converters, which supply the tramway network at a direct pressure of 500 volts. If we assume that at full load the efficiency of the two Scott "phase transformers" be 96 per cent., that the efficiency of the transmission from one to the other is 85 per cent., and that the efficiency of the rotary converters is 92 per cent., we see that the efficiency at full load of the transmission from the generator terminals to the overhead trolley for the tramways is $0{\cdot}96 \times 0{\cdot}96 \times 0{\cdot}85 \times 0{\cdot}92$, that is, about 72 per cent. At light loads the efficiency would be less.

COURT OF COMMON COUNCIL.

A MEETING of the Court of Common Council was held at the Guildhall on Thursday last week, the Lord Mayor presiding.

Forcing-House at the City of London Cemetery.—The Sanitary Committee submitted a tender, which was accepted, of Messrs. Duncan, Tucker, & Son for the erection and completion of a span-roofed forcing-house at this cemetery, for alterations to piping and staging, new boiler and piping, etc., and for maintaining the same for a period of six months after completion for the sum of 130*l.*

Proposed New Subway.—The Streets Committee, reporting on the arrangement and plan agreed to by the Corporation on January 30, 1902, for the construction of a subway between the Bank Stations of the Central London Railway and the City and South London Railway, at the level of the booking-offices, stated that they had requested Mr. Alpheus C. Morton, M.P., to take such action in Parliament as he may deem advisable, with a view to effect being given to the arrangement, and recommending that the City Members be asked to support Mr. Morton. Mr. Stropher, Chairman of the Streets Committee, said that they were most anxious to carry the arrangement out, but the railway company contended that the work was part of their circle scheme which was rejected by Parliament. It was proposed to construct the subway from St. Swithin's-lane to Gresham-place. Mr. Morton said that he would be very pleased to act with the other City representatives in the House of Commons. The recommendations were approved.

Drawing and Teaching of Art Congress.—A letter was laid before the Court from the Chairman and Vice-President of the British Committee of the Third International Congress for the development of Drawing and the Teaching of Art, to be held in London at the end of July, 1908, asking the Corporation for a grant of money towards the expenses of the Congress.

Proposed Improvement in the Council Chamber.—Mr. Rupert Smyth moved that it be referred to the City Lands Committee to consider and report upon the sufficiency or otherwise of the accommodation now at the disposal of the representatives of the Press who may desire to attend the meetings of the Court. Mr. Deputy Millar Wilkinson seconded, and the motion was agreed to.

METROPOLITAN ASYLUMS BOARD.

AT the fortnightly sitting of the Metropolitan Asylums Board on Saturday the following matters were dealt with:—

North-Western Hospital.—A letter was received from the Local Government Board stating that they approved the plan relating to the proposed extension of the staff laundry at the North-Western Hospital.

Brook Hospital.—The Local Government Board also sent a letter expressing approval to the plans submitted for the provision of additional storage for coal at Brook Hospital, and sanctioning an expenditure not exceeding 500*l.* on the work.

Park Hospital.—A report and plans by the Chief Engineer suggesting the repair of roads at Park Hospital at an estimated cost of 500*l.* was approved. The Engineer further reported on the serious defects which have been discovered in the drainage system at Park Hospital, and it was agreed to refer the work to the Works Committee to be carried out at a cost not exceeding 320*l.*

Caterham Asylum.—The Works Committee reported that in reply to the Local Government Board's letter of March 14, in which the Board felt that the estimated cost (2,500*l.*) of providing additional mess room and sleeping accommodation for the male staff at Caterham Asylum was unduly high considering the amount of accommodation shown on the plan. They had pointed out that the estimate of cost was based entirely upon the cost of the laundry-maids' quarters, which were erected at the hospital three years ago, and were of a nature almost identical with that now proposed, viz., removing the roofs from one-story buildings, raising the walls in order to form a first-floor, and providing entirely new roofs. Mr. Hatch pointed out that the building for the laundrymaids cubed out at practically 8½d. a foot, and that this figure was adopted by him in connexion with the proposed male staff quarters.

Obituary.

MR. A. H. SKIPWORTH.—We record with great regret the early death of Mr. A. H. Skipworth, a former pupil of Mr. Bodley, and an architect possessed of very high artistic gifts and insight. We have expressed on another page our own appreciation of him; we print here the following memorial notice from one who had known him long and intimately:—

"A man of strong personality in his work, both ecclesiastical and domestic, Mr. Skipworth exercised a considerable influence. St. Etheldreda's Church, Fulham, and the noble series of drawings for the new chapel of the Community of the Resurrection at Mirfield, seen in the Royal Academy last year, may stand as types of his work, the breadth and largeness of which compares best with mediæval examples. The new vicarage at Ingrave, Brentwood, barely yet complete, exhibits the beauty and charm of his domestic work, as well as the rapid advance in power of which his recent work gave evidence. For ever learning, his work constantly improved, and he was just getting that complete mastery over his materials which shows supreme power. A man scrupulous beyond measure to carry out as perfectly as possible what he undertook, only those intimate with his daily life could realise the courage with which he persisted in the face of immense difficulties in getting his ideas realised. Profoundly impressed with the importance of art, he strove to do his work well. Traditional in the real sense of that word, he carried on the spirit of the old art, without any affected mediævalism. He showed a great example in always seeking out men of personal attainment as artists to co-operate in his work. Whether it was painting, or sculpture, or other applied ornament, he would take any trouble to procure it from good craftsmen. He would scour the country to get the right tile or brick, and was courageous in rejecting whatever failed to reach the standard he had set himself—spending himself over his work in every way, fighting through difficulties with contractors, the inertia of workmen, and all the countless obstructions that stand in the way of a high personal ideal. If one is asked the difference that lay between him and so many others, it is this: That whereas most surrender to the conditions of their time, his life was a constant and untiring struggle against them. He never gave up, and it is this steady, unswerving attachment to the high ideal he set before him that is so great an example. Not without misunderstanding at times, and with little public recognition, he has gone down in the battle, but round his grave on Tuesday last, in Highgate Cemetery, stood most of that intimate circle who had always loved and valued him, including Professor Simpson, Messrs. A. G. Humphreys, Bainbridge, Reynolds, E. P. Warren, Conrad Dressler, Reginald Hallward, and others. The Bishop of Bristol, the uncle of Mr. Skipworth, officiated. But it is as one of the circle of his

most intimate friends that I desire to record my sense of the noble and lovable qualities of his nature. He was never more troubled than when he experienced the slightest insincerity or lack of honour, being incapable of the least insincerity himself. The faithfullest of friends, beloved by children, under a retiring and modest exterior he revealed to his intimate friends the most beautiful nature. A shadow was over his life in that he seldom enjoyed good health, but a great happiness had come into his life, and there appeared the opening out of his work to wider recognition. But his rest came on Friday, April 12. By one who shared his life in so many ways and for so many years, these words, under the sense of irreparable loss, are written."

General Building News.

NEW CHURCH, FARNHAM COMMON, BUCKS.—Princess Christian recently laid the foundation-stone of a church at Farnham Common, near Farnham Royal, Bucks. The new building is estimated to cost 2,000*l*. The architect is Mr. Charles Ford Whitcombe. The length of the building will be 84 ft., and width 34 ft. It will consist of an apsidal chancel, a nave in five bays, and north and south aisles, with an oak porch on the north side.

PRESBYTERIAN CHURCH, EGREMONT, LIVERPOOL.—On the 16th inst. the foundation-stone was laid of the new Egremont Presbyterian Church, by Lord Balfour of Burleigh. The building will occupy a position at the corner of Seabank and Manor-roads. The whole of the exterior, as well as the interior of the church, is to be built of Runcorn stone ; the floor will be of oak blocks ; the doors, gallery front, seating, etc., of Dantzic oak. From Seabank-road the two entrances lead into an inner vestibule, from which the nave is entered. The nave, which is 43 ft. wide, has an arcade of five arches on either side separating it from the aisles, which are used as passage ways only. A double transept is provided on the south side of the nave. Over the main entrance vestibule a gallery is placed, giving seating accommodation for about 130 people. The total number of sittings is about 950. On either side of the choir space the organ is placed, having a blowing chamber in the basement. The hall will accommodate from 400 to 500 persons. Five class-rooms are provided, separated from the hall by means of movable screens. The cost of church and hall is set down at about 17,000*l*. Messrs. Briggs, Wostenholme, & Thornely, of Liverpool, are the architects, Messrs. George Parker & Son, Edgehill, being the contractors, and Mr. Cottam the clerk of the works.

SCHOOL CHAPEL, BEDFORD.—A new chapel is being erected at Pemberley in connexion with the Bedford Grammar School. The building will be Gothic in design. The walls and buttresses will be of brick, with stone copings, parapets, window-dressings, and tower battlements. The architect is Mr. G. F. Bodley, R.A. The contract is in the hands of Mr. S. Foster. Mr. Kiddell is clerk of the works, and Mr. R. G. Robinson is the general foreman in charge.

TECHNICAL SCHOOL, DUNDALK.—On the 11th inst. the new municipal technical school at Dundalk was opened by the Cardinal Archbishop of Armagh. The new school, which is situated on a portion of the grounds formerly attached to the ancient Friary of St. Leonards', has been erected by Mr. T. M'Donald, of Dundalk, at a cost of 3,291*l*. Mr. Maurice Sellars, C.E., Borough Surveyor, Dundalk, prepared the plans.

CRICKET AND BOWLING PAVILION, BLUNDELLSANDS.—A pavilion has been erected for the new Northern Cricket and Bowling Club at Blundellsands from designs by Mr. G. W. Fraser, architect, Liverpool, at a cost of nearly 1,000*l*. The building contains a reception-room, club-rooms, dining and dressing-rooms, and bathrooms fitted with hot and cold showers.

THE NEW SHIRE HALL, BURY.—The new Bury Shire Hall is now nearing completion. The building contains four floors. In the basement are barristers' rooms, an office for the Clerk of Assizes, jury rooms, two large record rooms, and rooms for witnesses in waiting. There is a corridor running the whole length of the courts, by which the public have access to them. On the ground floor are offices for the Clerk of the Peace and accountants' department. This floor communicates with the large courts at the level of magistrates' benches and the judge's seat. On the second floor there is a room for the use of the Grand Jury, two committee-rooms, and offices for the County Architect (Mr. A. Ainsworth Hunt). The top floor is for the use of the Education Secretary (Mr. F. R. Hughes), and his staff. There is also a committee-room. The building, with the exception of the roof, is practically fireproof, all the floors being of ferro-concrete construction, executed by Messrs. Stewarts, of London and Manchester. The floors of rooms are finished with pitch-pine boards, whilst the floors of corridors are of wood blocks in pitch-pine. The main staircase in the centre of the building is in artificial stone (Brooks' non-slip patent), with wrought-iron balustrade, while the handrail is of polished mahogany. There is an electric lift running through the well hole of the centre of this staircase to the basement, with opening for stopping at each floor. There is also a small supplementary staircase at the east corner of the building, by which the public will have access to the gallery of the large court, and also for witnesses to have access to the Grand Jury room on the first floor. That apartment is the largest room in the new part of the building. The adjacent waiting-room is for witnesses, and the retiring-room is for use when the Grand Jury are sitting. The other two committee-rooms are finished similar to the Grand Jury-room, with oak dado and ornamental ceilings. The beautiful wrought-iron work in the balustrades and lift enclosures, together with the gun-metal door furniture and fittings, were made by Messrs. Clubb & Sons, Sudbury, from designs by the architect, Mr. Ainsworth Hunt. The building will be heated by open fireplaces, with radiators for the corridors and larger rooms ; there are hot-water fittings. This part of the work has been carried out by Messrs. Portway, of Sudbury. The windows on the main staircase were filled with stained glass by the Norwich Glass Company, from designs furnished by the architect. The outside doors, and many of the main doors are of English oak, wax polished, and fitted with gun-metal handles. The general building contract was carried out by Messrs. Mason & Son, of Haverhill, from plans prepared by Mr. A. A. Hunt, the County Architect. When the Building Committee first considered the question of alterations to the Shire Hall the Committee invited competitive designs, appointing their architect (Mr. A. Ainsworth Hunt) as assessor. Fourteen sets of sketch designs were received, and that of Mr. Arthur Field, of Ipswich, was considered the best, and his plan, after alteration, was taken for the general idea of the building.

THE MARTINEAU MEMORIAL, NORWICH.—The buildings forming the Martineau Memorial are to be dedicated as the Centenary Memorial of Dr. James Martineau, and are for the use of the Octagon Chapel and Sunday School. A site has been acquired on the north side of Colegate-street, adjoining the entrance to the Octagon Chapel, and between it and the entrance to the old Meeting House. On this site it is intended that the memorial buildings should occupy one-half, leaving two houses on the other half, the rentals of which will assist the maintenance of the new buildings. The new buildings have been designed externally in keeping with the Octagon Chapel and surroundings in the traditional manner of domestic English buildings prevalent two centuries ago. Local materials will be used in facing the walls and the roofs covered with red tiles. There are two stories in the main building, with a third story over a portion facing Colegate-street. The ground floor contains two classrooms and entrance-hall, also two stone fireproof staircases to the upper floor, and kitchen accommodation and lavatories. On the first floor are a large lecture-hall with raised stage, and a classroom capable of being added to the lecture-hall, so that seating accommodation could be provided for nearly 350 persons. There are also on this floor three smaller class-rooms and minister's parlour. On the upper floor at the front are a large recreation-room and an anteroom adjoining. The contract for the erection of the building has been placed with Messrs. Scarles Bros., of Norwich, Messrs. J. & J. King, also of Norwich, undertaking the sanitary, plumbing, and decorative work. The total cost is estimated at about 4,000*l*. Mr. H. Chatfeild Clarke is the architect.

Sanitary and Engineering News.

CARDIFF SEWERAGE.—Works are in progress for the new western district sewer, with a reservoir sewer, and a tunnel at Eastbrook beneath the Barry Railway. A double line of 30-in. cast-iron mains from the pumping-station is being laid between the gauge chamber at Llandough, and the steel pipe arch across the river Ely. The steam generating plant is supplied by Messrs. Meldrum Brothers; the contractors for the pumping machinery are Messrs. Summers & Scott.

WATER SUPPLY, BARROW.—Messrs. Kennedy Brothers, of Glasgow, have secured the contract for constructing, at an outlay exceeding 150,000*l*., works to increase the capacity of the storage at Seathwaite Tarn, and to convey a supply drawn directly from the river Duddon by means of 10-in. pipes to a high service reservoir at Barrow. The enlarged capacity at Seathwaite Tarn will avail in compensation for the supply drawn off in dry seasons from the river.

SCARBOROUGH HARBOUR.—The late Mr. Hawkins's project for improvements will shortly be carried into effect by deepening the Old and East Harbours by about 4 ft. to approximately low water, building a timber jetty at the outer end of the west pier, and adding 4,300 sq. yds. of quay-space to that pier by means of a concrete wall at a parallel distance of about 70 ft. from the subsisting wall. The foundations of the wall, to rest upon clay, will be encased in sheet pilings driven through a thick bed of sand.

QUAY EXTENSION, PARKESTON.—The quay extension which the directors of the Great Eastern Railway Company recently arranged for Parkeston is, states the *Times*, now under construction. It is 1,080 ft. long, and will provide for the reclamation of a triangular area affording accommodation for railway sidings, as well as for some buildings to be used as transit and locomotive sheds. Three new berths, 320 ft. long each, will be available for steamships. The quay is founded upon about 450 ferro-concrete piles driven through a 15-ft. bed of gravel into a stratum of hard clay, commencing at the average depth of 44 ft. below quay level. At the back of the structure some 870 ferro-concrete grooved and tongued sheet piles will provide a wall for the purpose of holding up the material to be tipped upon the area for reclamation, and above the sheeting a curtain wall will be built to deck level. Further, a horizontal platform will extend landwards to support and utilise part of the filling, so as to counterbalance a considerable proportion of the horizontal thrust of the earth against the quay. Along the harbour front the quay will be supported on ferro-concrete piers. The superstructure constitutes a continuously monolithic framework, comprising columns, wallings, bracings, beams, and decking, all of ferro-concrete, amply reinforced with steel, so as to be capable of withstanding without injury any stresses that may be developed. On the decking of the new quay three tracks for railway trains and a track for travelling cranes will be provided in addition to hydraulic capstans and other appliances. Before final completion of the works, the bed of the harbour in front of the quay will be dredged so as to give a minimum depth of 20 ft. at low water, and as the tidal range is about 12 ft. at Harwich, this will ensure the depth of fully 32 ft. at high water. The quay extension was designed by Mr. John Wilson, M.Inst.C.E., the chief engineer to the company, in accordance with the Hennebique system of ferro-concrete, all details of which were prepared by Mr. L. G. Mouchel, M.Soc.C.E. (France), of Westminster.

Foreign.

FRANCE.—M. Pascal has been elected President of the Jury of Architecture for the Salon, and MM. Daumel and Bernier Vice-Presidents.——The "Ligue Franco Italienne" intend to promote a public competition for a monument to Garibaldi to be erected on a site in the XVth arrondissement of Paris.——A transporter bridge over the Tongues is to be established at Trouville, which will convey passengers from the quay and land them at Deauville. The cost is estimated at 160,000 francs.——M. Vaillant, architect to the Department of Eure-et-Loire, has been elected President for the year of the Société des Architectes of that Department.——The Pereire quay at St. Nazaire is to be extended, at a cost of 2,580,000 francs.——It is proposed to undertake at Gien the work of the restoration and preservation of the fine château built by Anne de Beaujeu in the XIVth century.——The Municipality of Toulon have decided on the erection of a college for girls, and the rebuilding of the Palais de Justice and the prison. The whole proposed works are estimated at 3,300,000 francs.——The jury of the Ecole des Beaux-Arts commissioned to judge the Chenavard competition have awarded the prize to M. Janin, a pupil of M. Laloux.——M. Mancel, architect, of Paris, has obtained the first premium in the competition for a new Savings Bank at Gien.——A new asylum is to be built at Macon.——M. Loquet, architect to the Department of La Vendée, has been commissioned to prepare the plans for a new prison at La Roche-sur-Yon, the cost to be limited to 150,000 francs.——The Municipality of Limoges have voted a sum of 170,000 francs for a fire-brigade barracks.——The Municipal Conseil of Paris have given an order for the execution of sixteen busts of eminent men born at Paris, which are to form part of the decoration of the sculpture gallery in the Petit Palais. Among the number will be the busts of the architects Pierre Lescot, Mansart, Gabriel, and Viollet-le-Duc.

GERMANY.—The work of restoring St. Michael's Church, Hamburg, which last July was destroyed by fire, has been entrusted to Messrs. Faulwasser, Geissler, & Meerwein. It has been decided to rebuild the church on its original lines instead of following a new design as suggested by those actuated by "the modern spirit of the times."

The construction will so far be modern that steel will replace wood wherever possible, and the copper covering of the tower will be laid on cork instead of on a wooden shell. The galleries and stairs will be of ferro-concrete, and while for its acoustic properties the vault will be of wood covered with plaster, this will be isolated from the roof by a fireproof ceiling. It is estimated that the restoration will cost 3,529,000 marks, and will be completed in four and a half years.——The new home for Incurables has been built 7 kms. outside the town, from the designs of Messrs. Wolff & Ruprecht. At present the three buildings can accommodate ninety men and sixty women patients, but the site has been so laid out that thirteen more blocks can be erected on it as occasion arises. The existing blocks cost 305,070 marks.——The International Congress for Hygiene and Demography will be held in Berlin from September 23-29, 1907. The Conference will be subdivided into eight sections, viz., hygienic microbiology, hygienic physiology, hygiene with reference to childhood and schools, care of the working classes, prevention of infectious diseases, sanitary dwelling-houses, hygiene in connexion with travelling, military and naval hygiene, demography. On the payment of 20 marks, any lady or gentleman scientifically or practically interested in the subject may become a member of the Congress. Further information to be obtained from the President of the statistical Central Commission, 5, Schwartzenbergstrasse, Vienna.——The architectural character of Hanover is undergoing an important change. Forty years ago Professor Hase, the leader of the so-called Hanover School, made brickwork popular. Much of the material used was of inferior quality, with the result that rows of dull, unsightly streets were erected. Now the feeling is all in favour of plaster work, and the many-coloured, bright wall surfaces leave an impression of cheerfulness which was totally lacking before.

AUSTRIA.—The Municipality of Jägerndorf has commissioned the sculptor, Karl Wollek, of Vienna, to execute the equestrian statue of the Emperor Franz Josef, his model having been adjudged the best. The Emperor is shown as arrayed in the uniform of a Field-Marshal. The cost is estimated at 60,000k.——The Company of Slaters and Tilers, Vienna, has decided to raise prices in connexion with their trade by 15 per cent. The reason adduced for this step is the increased cost of raw material and the higher wages that have obtained since January 1.

SWITZERLAND.—In the competition for the enlargement of St. John's Church, Davos-Platz, the first prize was won by Messrs. Schäfer & Risch, of Chur.

Miscellaneous.

PROFESSIONAL AND BUSINESS ANNOUNCEMENT.—Messrs. Jarman Daws & Co., builders and contractors, have succeeded to the business of the late Mr. J. W. Brooking, of Eton-street, Richmond (Surrey).

ATHENÆUM CLUB.—Amongst the new members who have just been elected by the committee under Rule II. of the club are Mr. Solomon J. Solomon, R.A.; Professor Thompson, D.Sc., F.R.S., Principal of the City and Guilds Technical College, Finsbury; and Professor Tilden, D.Sc., F.R.S., Dean of the Royal College of Mines.

THE CITY OF LONDON DIRECTORY.—The City of London Directory for 1907 (Messrs. W. H. & L. Collingridge, 148, and 149, Aldersgate-street, E.C.) is the thirty-seventh annual edition of a very useful, well-arranged and edited and reliable guide to the City of London. All the information concerning the City Corporation, the Committees, the City officials, and the livery companies is given as usual, and the names of the members of the newly-elected London County Council and of the members of the Committees are given. The Livery Companies' Guide supplies the names and addresses of the Masters and Courts of Assistants, engravings of the arms, historical accounts of the companies, a review of their ancient powers and present privileges, particulars of fees, and details of their charities, etc. The Alphabetical List contains the name, address, and trade or profession of every person or firm, and the floor occupied by them, as in the Streets Section. The Trades Guide is classified under the various trades or professions, and the Biographical Section comprises portraits and Biographies of the Aldermen and principal officers of the Corporation, the City Members of Parliament, and many of the Masters of the livery companies. There have been minor alterations in the streets of the City during the last twelve months, all of which have been recorded in the large coloured map which is given with the work. The price of this useful work is 12s. 6d.

ENGINEERING AND MACHINERY EXHIBITION.—Sir Alexander Kennedy and Sir Alexander Binnie are appointed president and vice-president of the honorary advisory council for the exhibition which will be held at Olympia, West Kensington, in September 19—October 19 next.

BILLINGSGATE MARKET.—As an alternative to the removal of Billingsgate Market to Shadwell, the City Corporation might well take into consideration the proposal made nearly a quarter of a century ago by Mr. A. T. Walmisley in a letter to the *Times*. The main feature of this suggestion was the building of an upper story to the existing structure to serve the purpose of a retail market, access being contemplated by means of an approach from King William-street at the level of London Bridge. There would be no structural objections to the realisation of the scheme, and in view of the large number of people who cross London Bridge on the way home every evening, it is probable that a large measure of support would be given to a fish market readily accessible from the upper street level.

IPSWICH AND DISTRICT MASTER BUILDERS' ASSOCIATION.—The annual dinner of this Association was held at the Crown and Anchor Hotel, Ipswich, on the 11th inst. Mr. M. Death (President) occupied the chair. Mr. C. Borrett proposed "The Town and Trade of Ipswich," and said he thought that the Town Council of the borough might have lessened the acuteness of the unemployed problem in the town by doing something to encourage building on some of the empty building sites that existed in the town. Mr. W. Pipe, in replying, stated that his early experiences of the building trade showed him that his prices were being ruled not by what a building cost, but what another man was willing to erect the building for. Mr. C. E. Whitmarsh also replied, and questioned whether the unemployed question in Ipswich was due to the town being overbuilt, as was suggested by a certain Town Councillor. It was rather due, he thought, to the shrinkage of capital and the reduction of the value of high-priced securities. He hoped that the Chamber of Commerce would look into the question of railway rates to and from Ipswich.—Mr. A. Girling proposed "The Architects and Engineers," coupled with the name of Mr. J. A. Scheuermann, who, in replying, denied the statement of one of the previous speakers that architects were any party to doing away with quantities. The client sometimes insisted on it, but it remained with the builders to insist upon quantities in work over a certain amount.—Mr. W. Johnson proposed "Success to the Ipswich and District Master Builders' Association." As regards trade in Ipswich, he believed they had now turned the corner, and that brighter times were in store for them. Mr. E. Catchpole, who first responded, said that with regard to the unemployed question, he considered that the agitation amongst Ipswich workmen for higher wages had brought in men from the outside, and in some cases they had taken the place of men in the town, so that he did not think the men in the town had gained very much by the rise. A large number of unskilled workmen had been brought into the town by the various public works that were taking place a few years ago, and now found a difficulty in obtaining employment. Mr. F. Grimwood also replied.—Mr. George Abbott proposed "The President, the Treasurer, and Secretary." The President and Mr. C. Borrett, Treasurer, and Mr. W. T. Borrett, Secretary, responded.—The toast of "The Visitors" was submitted by Mr. Borrett, and replied to by Mr. Geo. Fenn, Mr. Laughlin, and Mr. Whittaker, Felixstowe.

Capital and Labour.

JOINERS' STRIKE, AYR.—A strike affecting about 110 out of 300 operative joiners in Ayr has been settled. The men came out as a protest against a proposal on the part of the employers who are members of the Masters' Association to alter the date of the signing of the yearly agreement from April 1 to July 1, to fix the rate of wages on a sliding scale at a halfpenny under the Glasgow rate, and to extend the short-time winter period from three to four months. The men have accepted the short-time period and the sliding scale of wages, and the masters have departed from their proposal to alter the date of signing the annual agreement, and on these terms the men have agreed to resume work.

COVENTRY DISPUTE.—The arbitrator who has been acting in the dispute between the Coventry and District Master Builders' Association and the Builders' Labourers' Society has given his award providing for an alteration of rules in regard to what is known as "walking time." This is to be allowed to all work beyond one and a half miles from Broadgate at the rate of three miles per hour, to be measured from such boundary, the operative to walk home in his own time except on Saturdays. Lodgings shall be paid for at all work beyond four miles distance at the rate of 3s. per week. Third-class fare to be allowed in and out once a week to all work up to ten miles, and above that distance special arrangements to be made between employer and employed. Other conditions are laid down as to walking time in regard to employers whose recognised place of business is not within the mile and a half from Broadgate or is outside a three-miles radius. An addition is also made to existing rules that repairs to bakers' ovens, brick sewers, and boiler flues shall be paid a halfpenny per hour extra.

LABOUR RETURNS.—The labour returns published in the Board of Trade *Labour Gazette* for March show an improvement in the condition of the building trade, and it is stated that the month has been more satisfactory than in any year since 1903. Nearly 2 per cent. less of the carpenters and joiners were unemployed than at the same time a year ago, and although some branches of the trade continue dull it is satisfactory to note signs of a general improvement. The general statistics as to trade also are satisfactory, the percentage of unemployed being 3·6 as compared with 3·9 in March, 1906. An increase in wages of 25,622*l.* per week, affecting 506,799 workpeople is also recorded, and the first three months of the year have shown an increase in wages of 67,113*l.* per week, affecting 972,741 workpeople. Thirty-two new trade disputes commenced in the month, as compared with twenty in the corresponding period last year, but only 12,177 persons were involved as compared with 28,753 in March last year. The duration of disputes new and old was 105,400 working-days, as compared with 181,800.

Legal.

CASE UNDER THE LONDON BUILDING ACT.

THE case of the King *v.* Denman, Esq., Metropolitan Police Magistrate (*ex parte* the Palace Theatre Company), came before a Divisional Court of King's Bench, consisting of the Lord Chief Justice and Justices Darling and Phillimore, on the 13th inst., for argument on a rule *nisi* which had been obtained calling upon Mr. Denman, the Stipendiary, to show cause why he should not state a case raising a point of law for the decision of the High Court.

It appeared that outside the Palace Theatre there had been erected what was described as a temporary structure, 13 ft. high and standing about 3 ft. from the building, and it was used for the purpose of displaying advertisements through a transparent surface, which was illuminated at night from the inside. For the prosecution it was contended and the magistrate convicted on the ground that it was a building or a structure within the meaning of the London Building Act, 1894, and that being beyond the building line the theatre company were liable to be fined. The theatre company, on the other hand, contended that it was not a building or a structure within the meaning of the Act, being merely bolted to the wall of the theatre, and having no foundations. It was also in dispute as to whether the structure was beyond the building line.

The magistrate sent an affidavit to the effect that no question of law was raised, and that he decided the case on the facts.

After hearing the arguments of counsel, their lordships discharged the rule, the Lord Chief Justice stating that he agreed with the magistrate that the question in dispute was one of fact, and therefore he thought his judgment should stand.

Justices Darling and Phillimore concurred.

TARMAC PAVING:

ACTION AGAINST BRIGHTON CORPORATION.

IN the Court of Appeal, before Lords Justices Vaughan Williams, Moulton, and Buckley, on the 10th inst. the case of Rex *v.* the Mayor and Corporation of Brighton (*ex parte* Edward Dudley Shoesmith) was heard on the appeal of the defendant Corporation from a judgment of a Divisional Court of King's Bench.

The case came before the Divisional Court for argument on a rule *nisi* from a *certiorari* which had been obtained by Mr. Shoesmith calling upon defendants to show cause why orders for payment of 2,500*l.* and 550*l.* should not be brought up so that they might be quashed. The orders in question related to expense incurred in 1905 with the view of the Automobile Club holding speed trials on the Madeira-road at Brighton, but Mr. Shoesmith objected to the expenditure on the ground that it was illegal, and applied for and obtained the rule *nisi* for a *certiorari*. The Divisional Court held that the expenditure was illegal, and made the rule absolute. From this decision the Brighton Corporation now appealed.

Sir Robert Finlay, K.C., Mr. Eldon Banks, K.C., and Mr. Humphreys appeared for the appellants, and Mr. Montague Lush, K.C., and Mr. Ernest Pollock, K.C., and Mr. Carson for the respondent.

Sir Robert Finlay, in opening the case, said the question for decision was whether the cost of laying the Madeira-road at Brighton with tarmac, kerbing it, and making a footpath was to be thrown upon the members of the Corporation

who voted for the expenditure, as the Court of King's Bench had decided, or whether it could be properly paid out of the Corporation funds. The ground on which the Divisional Court threw the expenditure on the individual members of the Corporation was that the expenditure had no other object than promoting or facilitating automobile races, which were held on the Madeira-road. It was never in dispute that the immediate occasion which recalled to the attention of the Corporation the question of laying tarmac in the Madeira-road—a question raised several years before—was the offer of the club to have the ráces at Brighton if that was done. That was not in dispute at all. But, so far from that being, as the Divisional Court had hinted, the beginning and end of the matter, it was really only the occasion. Before incurring the expenditure the Corporation made inquiries, and were advised that the laying of tarmac on the road would be a permanent improvement to the town of Brighton. Instead of having a road defective in various ways the town had now got a road which was admirably adapted for the purpose which it served and which constituted a permanent improvement, and by the decision of the Divisional Court the cost was to be borne by the members of the Corporation who voted for it. Before the tarmac was laid there was no footpath, and now there was one. Again, after the surface of the road was laid with tarmac the water ran off instead of forming in puddles, which was a great improvement. It was an error to suppose that the Corporation did not consider whether the laying of the road with tarmac would constitute a very marked improvement, which, in fact, it had done.

Lord Justice Buckley: Was the road at the time they did this a macadam road?

Sir H. Finlay replied that it was, and he would admit that it was in good repair. But the road had no footpath then, which it had now, and, again, the tarmac was a great improvement because it prevented dust and enabled water to be carried off easily.

Lord Justice Vaughan Williams said that the sole question the Court had to decide was whether the members of the Corporation laid down the road with tarmac for the purpose of improving a road in their district, or whether they did it for the purpose of carrying out a bargain they had thought fit to make with the club.

Sir R. Finlay contended that the Divisional Court had gone wrong on a question of fact.

Lord Justice Moulton asked if those members of the Corporation who voted for the new pavement with proper motives had to pay?

Sir R. Finlay replied that under the decision of the court below all those who voted for it were personally liable. The view taken in the court below was that all those who voted were involved in the current of automobilism, and they voted for it because they wished the motor trials to take place. He submitted that the affidavits made it clear that the Town Council did consider the propriety of the alteration as a permanent improvement. But even if the applicant for the rule could prove that all who voted for it did so because of the motor trials that would not make them liable if it was a right and proper thing to do.

Lord Justice Buckley said that the respondent could not put his case higher than that the members of the Corporation might have been moved by two motives, one of which was an improper motive.

Lord Justice Moulton: Unless you can get wasteage on the part of the Corporation, the fact that they seek a collateral advantage in doing that which is not *ultra vires* but in accordance with their powers, there could be no wrong.

Lord Justice Buckley asked if it was not within the powers of the Corporation to make improvements with the view of attracting visitors to the town?

Sir R. Finlay submitted that it was. In conclusion he submitted that the Corporation, in laying tarmac were acting within their powers, that they acted in good faith, and that there was no foundation for the decision that their action was *ultra vires*.

Mr. Eldon Bankes followed on the same side, and the appellants' case closed.

Mr. Lush, on behalf of the respondent, said there was ample evidence on the question of fact to justify the decision of the Divisional Court. He contended that the motive of the Corporation for laying the road with tarmac was to attract the automobile races to Brighton, and not for the purpose of carrying out a permanent improvement for the town.

Lord Justice Moulton said that speaking for himself he thought there was the clearest evidence of individual exercise of discretion by the members of the Corporation who voted for the tarmac paving as to what was best for the town.

At the conclusion of the arguments of counsel Lord Justice Vaughan Williams in giving judgment, said that in his opinion the appeal must be allowed. It had been said with a great deal of truth that the question was a question of fact. The suggestion made was that the Corporation of Brighton had exercised their powers for a purpose that was not justified by the statute which gave them those powers. It seemed to him to be well settled law that where the Legislature had vested in a public body certain statutory powers in the exercise of which the public body was intended to use its discretion, no court could interfere with the exercise of that discretion unless it could be shown that the discretion was not exercised in good faith. In this case, when the evidence was looked at, it was clear that the new surface to the Madeira-road caused by the laying down of tarmac was an improvement to the road which could have been carried out by the Corporation in the exercise of the powers conferred upon them. The Court had nothing to do with any question as to whether the spending of the money in this way was wise or not, if such expenditure was within the powers of the Corporation. He did not say that if the expense incurred were ridiculously large and beyond all reason that might not be strong evidence that the public body was not exercising its statutory powers for the purpose for which the Legislature had given it those powers. Nothing of that sort, however, occurred in the present case. The charge as to want of good faith was a very serious one—could it be said that the Corporation caused the surface of the Madeira-road to be laid out with tarmac for the convenience of the Automobile Club under colour and pretence of improving the highway? In his opinion, most certainly that could not be said. It seemed to him that, taking it to be true that the Corporation were induced to put tarmac surface to the road at the time they did, because they wished to have the road ready at a time when it would be available for the automobile trials or races, there was nothing in that fact to justify him in saying that the Corporation, under the colour and pretence of making the road more convenient and suitable for those who resided at or came as visitors to Brighton made the alteration for the purpose of obliging the Automobile Club. Though the occasion upon which the work was done was the visit of the club it seemed to him to be clear that this improvement of the road which would last for years, and which was of great convenience and benefit to those who were at Brighton was not carried out for the Automobile Club meeting under the colour and pretence that it was an improvement for the benefit of the people of Brighton. In his opinion the work was done for the improvement of the road, so as to benefit the people of Brighton, and it made no difference that it was done at that particular time in order that it might be completed before the Automobile Club meeting. He thought the appeal should be allowed.

The other Lords Justices concurred.

LITIGATION AS TO A BRICK CONTRACT.

THE case of Vint *v.* Moulsons & Mellors, Ltd., came before the Court of Appeal, consisting of Lords Justices Vaughan Williams, Moulton, and Buckley, on the 15th inst. on the defendants' appeal from a judgment of a Divisional Court of King's Bench reversing the decision of Judge Bompas sitting at the Bradford County Court.

It appeared that the plaintiff brought the action against the defendant company for damages for the alleged breach of the defendants of a contract to deliver to him at Bolton Woods, near Bradford, as many bricks as plaintiff required at 24s. 9d. per 1,000, less 2½ per cent. discount on monthly account. The case depended upon the true construction of two letters which had passed between the parties. Defendants alleged that the plaintiff was bound to take from them all the bricks he required for the erection of houses by him at Bolton Woods, and that he had repudiated the contract by getting a quantity of the bricks from another source. Plaintiff, on the other hand, denied that he had repudiated the contract, and said the reason he had obtained bricks from another source was because he could not get them from the defendants on a day which was a Bank-holiday. As defendants refused to supply him with further bricks at the before-mentioned price, the plaintiff brought the present action. The judge of the Bradford County Court held that the plaintiff could only insist on getting the bricks at an agreed price if he took the whole of the bricks for the building of the houses at Bolton Woods from the defendants, and entered judgment for the defendants. Plaintiff appealed from this decision to the Divisional Court, and in that court their lordships held that the plaintiff had never repudiated the contract, and that the defendants were not justified in treating the contract as at an end. They accordingly directed that judgment should be entered for the plaintiff if the damages could be agreed, and if not that there should be a new trial. From this decision the plaintiff now appealed.

After hearing the arguments of counsel their lordships allowed the appeal, holding that the documents in question did not constitute a contract. The judgment of the Divisional Court was accordingly set aside, and that of the County Court judge restored.

CASE UNDER THE PRIVATE STREET WORKS ACT.

THE case of the Herne Bay Urban District Council *v.* Farley, Smith, Payne & Wood came before a Divisional Court of King's Bench, consisting of the Lord Chief Justice and Justices Darling and Phillimore, on the 12th inst., on the appeal of the Urban District Council from a decision of Kent justices.

From the special case which had been stated, it appeared that on January 17, 1906, the Council resolved with respect to a street in the district known as Beacon-hill, Beacon-hill-parade, and the Lees respectively to execute certain works therein, being private works as defined by the private Street Works Act, 1892, and their Surveyor duly prepared a specification of the works, with plans and sections, and an estimate of the probable expense, and a provisional apportionment as required by the Act. The resolution was published, and the specification, plans, sections, estimates and apportionment were duly deposited. Within one month from the publication of the resolution the respondents, as the owners of premises abutting upon the street, by written notice served upon the appellants objected to their proposals on the following ground: that land, the property of the Council and abutting on the street ought to be inserted in the provisional agreement. The appellants, after the service of the notice, viz., on August 1, 1906, by resolution amended the said specification, plans, sections, estimate, and provisional apportionment by eliminating therefrom that part of the street known as the Lees. The justices heard the objections on September 1, 1906. It was admitted before the justices that the new street in question had buildings on the south side only; that the land on the north or sea-side of the street, known as the East Cliff, belonged to the appellants, and was purchased by them under the Public Health Act, 1875, for the purpose of a public pleasure-ground, and that under the covenants contained in the conveyance they were bound to keep the same as a recreation and pleasure-ground for the use of the public for ever. The expenses of the proposed works were apportioned by the appellants' Surveyor on the premises abutting on the south side only of the said street, and nothing was apportioned upon the said land on the north side thereof, which belonged to the appellants. The respondents contended that under sects. 6 and 10 of the Private Street Works Act, 1892, the expenses of private street works were to be apportioned on the premises fronting, adjoining, or abutting on the street in respect of which the expenses were to be incurred, and that as the said land of the appellants situated on the north side of the street fronted, adjoined, and abutted on the street, viz., on the north side thereof, such land should be included in the provisional apportionment, and be charged towards the expenses of the proposed works. The appellants contended that they were not "owners" within the meaning of the Public Health Act, 1875, and of the private Street Works Act, 1892, of the land on the north side of the street, the same being devoted to the use of the public as a recreation and pleasure-ground, and incapable of being let at a rack rent and that such land was not "premises" on which expenses incurred in executing private street works under the Statute of 1892 could be apportioned or charged. In answer to this contention the respondents submitted that although the appellants might not be liable as "owners" of the land on the north side of the street within the meaning of the Public Health Act, 1875, the land itself being premises fronting and abutting on the street, was within the terms of sects. 6 and 10 of the Private Street Works Act, 1892, and must, therefore, be included in the apportionment and that the appellants, in executing the works would then have to bear such proportion of the expenses of the private street works as was apportioned upon such premises. The justices held that under sects. 6 and 10 of the Private Street Works Act, 1892, this latter contention was correct, and that the expenses should be apportioned against the premises fronting, adjoining, or abutting on the side of the street called Beacon-hill and Beacon-hill-parade, including the land belonging to the appellants on the north side thereof, and they directed such provisional apportionments should be amended accordingly. From this decision the Urban District Council now appealed.

Mr. Glen, K.C., and Mr. Randolph Glen appeared for the appellants; Mr. Hohler, K.C., and Mr. Joseph for the respondents; Messrs. Farley & Smith, and Mr. Langdon, K.C., and Mr. Payne for the respondents, Messrs. Payne & Wood.

In the result, after hearing the arguments of counsel, their lordships held that the land in question on the north side of the street had to be included in the apportionment, and that it was impossible to say that an apportionment excluding that land was a good apportionment.

The appeal was accordingly dismissed with costs.

ALLEGED UNDISCLOSED EASEMENTS.

In the Chancery Division, on the 12th inst., Mr. Justice Swinfin Eady concluded the hearing of the case of Cropper *v.* Marketson & Storrs, an action by the plaintiff, a solicitor of Liverpool, against the defendants for recission of an agreement dated December 4, 1905, for the purchase by the plaintiff of a plot of land with the shops and offices on it, known as Grecian Chambers, on the north side of Dale-street, Liverpool, the purchase price being 10,000*l.*, of which 1,000*l.* was paid on the signing of the agreement. The plaintiff alleged that after the signing of the agreement he discovered that as regarded an open area measuring about 14 ft. by 9 ft. of the purchased property, the owners and occupiers of the adjoining property had easements of light in respect of certain windows overlooking the purchased property. The plaintiff's case was that the defendants ought to have told him that such easements existed, as they lessened the value of the property, and prevented its being adequately developed by the erection upon it of suitable new buildings.

The defence was a denial that the plaintiff was entitled to recission, and defendants counter-claimed that they were entitled to specific performance of the agreement.

In the result, his lordship, after hearing the evidence, held that the plaintiff's case had failed, and dismissed it with costs. He held that defendants were entitled to a decree of specific performance on their counter-claim.

Judgment accordingly.

APPEAL BY BIRMINGHAM BUILDER.

The case of Airey *v.* Smith came before a Divisional Court of King's Bench, consisting of the Lord Chief Justice and Justices Darling and Phillimore, on the 15th inst., on the appeal of Mr. Edward Airey, a builder of Birmingham, from a conviction by the justices of Birmingham on the prosecution by Mr. E. O. Smith, the Town Clerk of Birmingham, who, on March 14, 1906, charged the appellant with having, in October, 1905, in a new street then under construction leading out of Warr-lane, Harborne, in the City, carried out certain works for the drainage of the properties adjoining such new street on the east side thereof otherwise than in accordance with the specification of the City Surveyor. This provided that the whole of the front roof water from the houses in such new street was to be taken into the surface water sewer in the said new street, and each stack of down pipes to be separate connexions, but the appellant drained the roof water into a drain in front of such houses other than the said sewer, contrary to the statute. The appellant, who was represented by counsel, pleaded guilty, and was convicted, but the summons was formally adjourned to April 6 so that the appellant might have an opportunity of correcting the matters complained of, and the magistrates stated that if the matters were corrected they should take the fact into consideration in determining the penalty. Further adjournments took place from time to time at the request of one or other of the parties till October 8, 1906. On September 25, however, a second information was laid by the respondent against the appellant for an offence alleged in respect to certain works done by the appellant on the west side of the same new street. In this case it charged that the appellant between August 1, 1906, and September 25, 1906, did in a certain new street carry out certain works for the drainage thereof and the adjoining properties otherwise than in accordance with the specification of the City Surveyor contrary to the by-laws and the statute. This summons, together with the other, was adjourned to come before the magistrates on October 8, 1906, when it was contended on behalf of the appellant that in the second charge the case was *res judicata*, that the works executed on the west side of the street were, in fact, part of the works executed on the east side, and both works formed one scheme, in respect of which only one offence could be committed, and for which the appellant had already pleaded guilty, and had been convicted; that the by-laws made and confirmed in 1876, under which it was sought to convict the appellant, having been made and confirmed before the passing of the Birmingham Corporation Act, 1903, did not apply to surface sewers, they being for the first time given to the Corporation by this Act, sect. 65, and that there was no continuing offence for which daily penalties could be inflicted, as such penalties were not claimed in the information. On behalf of the respondent it was contended that the matter of the second summons was not *res judicata*, and that the by-law by itself and without reference to the Birmingham Corporation Act, 1903, applied to surface water sewers, such by-law being framed under the Public Health Act, 1875, and that there was a continuing offence. The Justices over-ruled all the contentions of the appellant, and found as a fact that the works executed by the appellant on the west side of the street were separate and distinct from the works executed by him on the east side of the street, and that such works were complete and in existence from August 17 to October 8, 1906, and were not in accordance with the specifications of the City Surveyor. They therefore convicted appellant of the offence charged in the second summons, and adjudged him to pay a penalty of 5*l.*, and a further penalty of 100*l.*, being 2*l.* a day for fifty days during which the offence continued, and 5*l.* 15s. costs. Against this conviction the present appeal was brought. For the offence charged in the first summons the magistrates ordered the appellant to pay a penalty of 5*l.* and a further sum of 5*l.* 12s. costs, but against this conviction there was no appeal.

Mr. H. Maddocks appeared for the appellant, and Mr. Horace Avory, K.C., and Mr. McCardie for the respondent.

In the result their lordships affirmed the decision of the Justices, and dismissed the appeal.

Patents of the Week.

APPLICATIONS PUBLISHED.*

2,156A of 1906.—M. Zelensky: *Method of and Means for Erecting Sectional Poles or Masts.*

This relates to a method of erecting a pole or mast consisting in successively hoisting sections of the mast and adding sections from below, and guiding or maintaining the mast in equilibrium by means of stretchers.

6,708 of 1906.—A. W. C. Scheff and J. Brodie: *Dandy Rollers and the Method of Manufacturing the same.*

This relates to a method of and means for manufacturing dandy rollers, which consists in first winding a cylindrical spiral or spirals of wire upon a suitable mandril formed with grooves or guides in which the said coil or coils is or are laid, then laying or fastening on said coil or coils, a series of longitudinal wires or bars, and then winding on said longitudinal wires a further spiral or spirals of wire, the whole being suitably secured together, and the mandril and roller removed the one from the other by employing the inner spiral or spirals of wire and the grooves or guides in the mandril as a screw, the roller being provided with end caps or otherwise suitably mounted, the other spirals of wire serving to support the usual working surface or sleeve where such is employed.

7,284 of 1906.—J. G. Horsey and E. Horsey: *Construction of Lever Lock.*

This relates to locks consisting of a casing, a bolt and a lever or levers fulcrumed below the bolt head to act as an abutment to the bolt, and consists in constructing each lever or tumbler with a slot or opening for receiving the bolt head, the levers being operated by a key in both directions, and positioned under the bolt head when in the locked position, at different points across its width.

10,260 of 1906.—C. Kershaw: *Siding Window Sashes.*

This consists of a sliding window-sash having the usual supporting cords and an upwardly inclined hollow for the reception of the knotted end of such cord.

11,002 of 1906.—E. F. Adams: *Bathroom Wash Basins and Fittings therefor.*

This relates to a bathroom washstand comprising a wash basin mounted upon a frame adapted to be hinged to the side or framing of a bath, and made in parts telescoping together, and consists in the combination with the wash basin of a flexible water supply tube passing through the hollow in the basin, and provided with a flange on its inner end.

11,421 of 1906. J. Whitehouse & Sons, Ltd., and F. H. Lees: *Knobs or Handles for Doors, Gates, and the like.*

This relates to knobs or handles for doors, gates, and the like, and consists in introducing centres of china, glass, or other material, tinted or coloured or plain, which are formed of the desired materiaf of such shape to fill or partially fill the interior ol the knob or handle. The knob is made in two parts, either by casting or stamping or by a combination of these processes. These two parts are called the body and the ring. In the body is placed the block of ornamented material, and then is placed over the same the ring, which is secured to the body by "rolling over," "soldering," or other means. The ornamented portion of the block appears through the opening in the ring.

13,462 of 1906.—D. B. Bostel, G. S. Bostel, W. M. Moxon, and A. Britton: *Flushing Cistern Mechanism.*

This relates to flushing cisterns, and consists in the combination of a valve in the down pipe, means for opening same and letting the water escape and causing it to remain open during the falling of the water independently of the mechanism which opened it, and means other than the use of more than one float for automatically closing the same when the flush is completed.

7,877 of 1906.—C. H. Jacobi: *Apparatus for the Automatic Opening and Closing of Pipes, Valves, and the like.*

This relates to an apparatus for the automatic opening and closing of pipes, valves, and the like at fixed intervals, and connected with a weight or clockwork operating the opening and closing, and is characterised by the circumstance that on the main shaft of the clockwork a drum is arranged, the circumference of said drum being equipped with a set of holes co-operating with a stopping arrangement. Another set of holes is arranged, the distances of the various holes being arranged conformably to the opening and closing intervals wanted, in which holes the releasing peg for the mechanism takes successively, and then gets immediately withdrawn by the said mechanism independently of the main shaft of the clockwork, to such an extent as to make the releasing peg strike the unperforated surface of the drum when returning.

16,012 of 1906.—J. Hamblet: *Arched Kilns for Burning Bricks and the like.*

This relates to an arched kiln or the like provided with one or more internal central longitudinal fireplaces between two casings and walls extending along the kiln from end to end in combination with two longitudinal heat flues arranged at the sides of the kiln, and provided with branch side flues which terminate in the central internal longitudinal fireplace or fireplaces of another similar kiln.

14,530 of 1906.—W. M. Ducker: *Devices for Supporting and Locking the Sashes of Windows.*

This relates to a device for supporting and locking the sashes of windows, and is characterised by having a casing fixed in position, a movable plate mounted slidably in said casing, and backed by a spring or spirngs, and a friction wheel or wheels mounted rotatably in said plate and provided with teeth to be engaged by a pawl or detent when the sash is lowered, and thus prevent the said wheel or wheels from rotating, but permitting said wheel or wheels to rotate when the sash is raised.

16,660 of 1906.—T. Bamforth and R. B. Kinniburgh: *Sliding Windows and Doors for Ships and the like.*

This relates to sliding windows and doors having side racks engaged by toothed pinions on a turning spindle and provided with toothed sectors at the ends of the racks adapted to be turned by said pinions, and consists in providing said racks with spiral teeth, which are skewed at the same angle as the teeth of said sectors, so that said pinions, after the racks have completed their movement, engage toothed sectors, said sectors being slidably mounted on rocking shafts which engage with ribs on the window-sash or door.

18,634 of 1906.—M. Hayes: *Ventilator and Draught Preventer for Windows.*

This relates to a ventilator and draught preventer for windows, and consists in the combination with a weatherboard or strip provided with horizontal air passages communicating with the outer side, and with vertical passages with their outlets in the upper part of the said strip, of a perforated band or its equivalent covering the entrance openings of said air passages, removable perforated caps covering the outlets of said air passages, and disinfecting material held within said passages.

19,973 of 1906.—C. A. Matcham: *Furnaces or Kilns for Preparing Cement-making Materials or the like.*

This consists in the combination of a main or clinkering furnace or kiln, opening at its upper end into the lower part of a hood or chamber, and two or more auxiliary furnaces or kilns opening at their lower ends into the upper part of the said hood or chamber, means being provided in the said hood or chamber for directing the material under treatment from the said auxiliary furnaces or kilns to the main or clinkering furnace or kiln, and means for supplying fuel to the said main or clinkering furnace or kiln.

20,503 of 1906.—T. Watkins: *Chimney-pots.*

This relates to a chimney-pot or cowl, and consists of four cast metal plates or baked clay slabs or the like having their upper and lower edges parallel, alternate or opposed plates having their upper and lower edges of equal width and their vertical edges parallel for about one-third from the top, and tapering in width from the base for about two-thirds of the height of the plate, two other plates having their vertical edges parallel for about two-thirds of their length from the base, while their upper portions taper to the top from a width equal to the narrowest dimension of the said plates, angular notches being formed in the side edges of the plates conversely directed in adjacent plates with or without interior projecting ribs cast or moulded on the upper and

PATENTS.—*Continued on page* 491.

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competition, iv.; Contracts, iv. vi. viii. x.; Public Appointments, xx.; Auction Sales, xxxiv.

Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bonâ-fide tender unless stated to the contrary.

The date given at the commencement of each paragraph is the date when the tender, or the names of those willing to submit tenders, should be sent in.

*** It must be understood that the following paragraphs are printed as news, and not as advertisements: and that while every endeavour is made to ensure accuracy, we cannot be responsible for errors that *may* occur.

Competition.

* NO DATE.—**Bethnal Green.**—MUNICIPAL OFFICES.—The Bethnal Green B.C. invite competitive designs for the new Municipal Offices, Council Hall, and Committee Rooms. Premiums of 100*l.* and 50*l.* offered. Further particulars of the Borough Surveyor, Town Hall, Church-row, Bethnal Green, N.E.

Contracts.

BUILDING.

APRIL 20.—**Bradford.**—WAREHOUSE.—A warehouse in Leeds-road, Bradford. Plans and specifications may be seen, and bills of quantities obtained, at offices of Mr. Benjn. Dobson, architect, 5, Charles-street, Bradford.

APRIL 20.—**Brentor.**—REPAIRS.—For general external repairs to house and buildings, Bonnaford Farm, Brentor, near Tavistock. Names to Mr. Charles Cole, architect, 50, High-street, Exeter.

APRIL 20.—**Driffield.**—ALTERATIONS, ETC.—The alterations and additions to Great Kendale, near Driffield. Names to Messrs. Tennant & Collins, A. and S., Pontefract and Barnsley.

APRIL 20.—**Elland.**—VILLAS.—The erection of two semi-detached villas, Victoria-road, Elland. Plans and particulars may be seen at offices of Mr. H. Thompson, architect, Southgate-chambers, Elland.

APRIL 20.—**Hereford.**—FACTORY.—A large cabinet-making factory to be erected at Eign, Hereford, for Messrs. Greenlands, Ltd. Names to Messrs. Groome & Bettington, architects and surveyors, Palace-chambers, King-street, Hereford. A deposit of 2*l.* 2s. must be paid for bills of quantities.

APRIL 20.—**Langley Park.**—HOUSES.—The erection of twenty-four houses at Langley Park for the Consett Iron Company, Ltd. Names to the Company's Architect (Mr. C. E. Oliver), General Offices, Consett.

APRIL 20.—**Leeds.**—SYNAGOGUE.—Proposed Synagogue, Albert-grove, Leeds, for Mr. Isaac Gattliffe. Applications for quantities to be made at office of Mr. Walter A. Hobson, architect, 41, Albion-street, Leeds.

APRIL 20.—**Pemberton.**—EXCAVATING AND LEVELLING SITE.—For proposed weaving shed, Enfield-street, Pemberton. Names to Mr. Richard Pennington, Library-street, Wigan, architect.

APRIL 20.—**Shorburn Colliery.**—ALTERATION, ETC., TO CHURCH.—Alterations and additions to the Primitive Methodist Church, Sherburn Colliery. Names to Mr. J. W. F. Phillipson, architect, Murton-chambers, 8, Grainger-street, Newcastle-on-Tyne.

APRIL 22.—**Barnsley.**—HOUSES AND SHOPS.—Pulling down of Oak Mills, laying out the estate, and the erection and completion of No. 12 houses and shops, also No. 40 dwelling-houses. Names to Messrs. Tennant & Collins, architects and surveyors, Regent-street, Barnsley, and at Pontefract.

APRIL 22.—**Hale.**—STABLES, ETC.—Hale U.D.C. invite tenders for the erection and completion of new stables, steam road-roller shed, etc. Plans and specifications can be seen, and bills of quantities and form of tender obtained, on the payment of a deposit of 1*l.* 1s. at the office of the Council's Surveyor, Mr. S. A. Pickering.

APRIL 22.—**Leeds.**—HOUSE AND SHOP.—Building of house and shop premises at the junction of Mabgate and Quarry Hill, Leeds, for Mr. James Drewery. Applications to Mr. Thomas Winn & Sons, architects, 84, Albion-street, Leeds.

APRIL 22.—**Meltham.**—ROOMS.—Additional rooms to the administration block at Colne and Holme Joint Isolation Hospital, Meltham. Plans may be seen, and bills of quantities obtained, on application to Mr. J. Berry, architect, 3, Market-place, Huddersfield.

APRIL 22.—**Pulteggan.**—COTTAGES.—For building at Pulteggan, Madron, for Mr. T. Robins Bolitho, a pair of cottages. The drawings and specifications can be seen at office of Mr. Henry White, Keigwidn, Heamoor, architect.

APRIL 23-MAY 6.—**Felixstowe.**—SCHOOL BUILDING.—The East Suffolk County Education Committee invite tenders for the erection of a special subjects' centre on part of the Central School playground at Felixstowe. Drawings, specifications, and form of contract may be seen at the offices of the Education Committee, County Hall, Ipswich. Builders may obtain a copy of the bills of quantities, together with a form of tender, by depositing with Mr. W. E. Watkins, Secretary, County Hall, Ipswich, before 10 a.m. on April 23 the sum of 1*l.* (cheques should be made payable to "W. E. Watkins").

APRIL 23.—**Perth.**—SCHOOL ENLARGEMENT.—Estimates are invited by the Perth School Board for the mason, joiner, plumber, plaster, and slater works in connexion with the enlargement and alteration of the Southern District School, South William-street. Schedules may be obtained, and plans and specifications seen, at the office of Mr. G. P. K. Young, architect, 42, Tay-street, Perth.

APRIL 23.—**West Stanley.**—REPAIRS TO RESIDENCE.—Durham C.C. invite tenders for repairs to the teachers' residence, West Stanley Council School. Plans, etc., may be seen, and forms of tender obtained, either at the school or at the Architect's Office, Shire Hall, Durham.

APRIL 24.—**Ashton-under-Lyne.**—FIRE-ESCAPE STAIRCASES, ETC.—The Guardians invite tenders for (1) the supply and fixing of fire-escape staircases at the Workhouse, and (2) for the structural alterations in connexion therewith. Specifications and quantities in each case to be obtained from Messrs. John Eaton, Sons, & Cantrell, architects, Stamford-street, Ashton-under-Lyne, after payment to Mr. G. H. Partington, Clerk to the Guardians, Poor Law Offices, Ashton-under-Lyne, of the sum of 2*l.* 2s.

APRIL 24.—**Blackwood.**—HOUSE.—Estimates wanted for the mason, joiner, plumber, and slater and plasterer works of new dwelling-house to be built at Auchenheath Farm, Estate of Blackwood. Plans and specifications will be shown by the tenant, Mr. Thomas Fleming.

APRIL 24.—**Insch.**—HOUSE.—For the mason, carpenter, slater, plasterer, plumber, painter, and glazier work of a dwelling-house to be built at Insch for Mr. James Milne, Manchester. Plans and specifications to be seen either with Mr. Robert Farquhar, chemist, Insch, or Mr. Thos. G. Archibald, architect, Huntly.

APRIL 24.—**Llwydcoed.**—HOUSES.—The erection of three houses at Llwydcoed for Mr. J. Windsor Lewis. Drawings and specification may be seen at office of Mr. J. Llewellin Smith, architect, Aberdare.

APRIL 24.—**Radcliffe.**—WESLEYAN CHURCH.—The erection of Wesleyan Church at Radcliffe, Northumberland. Plans and specifications may be seen on application to the architect, Mr. Wm. Burton, A.R. San. Inst., architect, 69, Queen-street, Amble.

APRIL 24.—**Sowerby Bridge.**—HOUSES.—The erection of six houses, Hollins-lane, Sowerby Bridge. Plans and particulars may be seen at offices of Mr. H. Thompson, architect, Southgate-chambers, Elland.

APRIL 24.—**Wainfleet St. Mary's.**—FARMHOUSE.—The erection and completion of a small farmhouse and outbuildings at Wainfleet St. Mary's. Plans, specifications, and particulars may be obtained of Mr. W. H. Gunson, brewer, etc., Wainfleet All Saints'.

APRIL 25.—**Bingley.**—HOUSES.—The erection of a detached, a pair of semi-detached, and a block of four houses, proposed to be built on the Manor Park Estate, Bingley. Plans may be seen, and quantities obtained, at the office of Mr. Wm. Rhodes Nunns, architect and surveyor, Market-street, Bingley.

APRIL 25.—**Coleraine.**—EXTENSIONS TO DISTILLERY, ETC.—For extensions, including a chimney, at Messrs. Brown, Corbett, & Co.'s Killowen Distillery and Maltings, Coleraine. Plans and specifications may be seen at the Distillery, and schedules of quantities will also be obtainable there, or from Mr. Charles C. Doig, architect, Elgin, N.B.

APRIL 25.—**Ferrybridge.**—ALTERATIONS TO INN.—Alterations to the Greyhound Inn, Ferrybridge, for Messrs. the Carter's Knottingley Brewery Company, Ltd. Plans and specifications may be seen at Pontefract office of Messrs. Garside & Pennington, architects and surveyors, Pontefract and Castleford.

APRIL 25.—**Glasnevin, Dublin.**—BOUNDARY WALL.—For the extension of the boundary wall of the branch residence for women students at Glasnevin, in accordance with a specification prepared by the architect, Mr. J. F. Fuller, F.S.A., 179, Great Brunswick-street, Dublin. The specification may be seen at the Training College, Marlborough-street, Dublin.

APRIL 25.—**Macallan.**—HOUSE.—The mason, carpenter, slater, plumber, plasterer, and painter works of officer's house at Macallan Distillery. Plans and specifications may be seen at 10, Seafield-square, Rothes.

APRIL 25.—**Littlehampton.**—BOUNDARY WALL.—Littlehampton U.D.C. invite tenders for the building of boundary wall and providing and fixing of unclimbable steel fencing about the new grounds of cemetery, with other work. Drawings and specification can be seen, and form of tender obtained, on application to the Council's Surveyor, Mr. H. Howard, F.S.I., Town Offices.

APRIL 25.—**Preston.**—RESTORATION OF TOWER.—For the restoration works required to be done to the tower of Preston Church, East Yorks. Plans and specification at offices of Messrs. Brodrick, Lowther, & Walker, architects, 77, Lowgate, Hull, and Central-chambers, Bridlington, or at Mr. Woodhouse's house, the Church Clerk, Preston.

APRIL 25.—**Rothes.**—HOUSE.—The mason, carpenter, slater, plumber, plasterer, and painter works of officer's house at Macallan Distillery. Plans and specifications may be seen at 10, Seafield-square, Rothes.

APRIL 25.—**Strathfillan.**—ALTERATIONS, ETC., TO MANSE.—Alterations and additions at Manse, Strathfillan, Tyndrum. Plans and specifications can be seen at the Manse.

* APRIL 26.—**Chingford.**—SORTING OFFICE.—Commissioners of H.M. Works, etc., invite tenders for erection of a new sorting office at Chingford. Drawings, specifications, conditions, and form of contract can be seen on application to Mr. Wager, H.M. Office of Works. Bills of quantities and forms of tender obtainable as below. Tenders, endorsed "Tender for Chingford New Sorting Office," addressed to Secretary, H.M. Office of Works, Storey's-gate, S.W., before 12 o'clock noon, April 26.

APRIL 27.—**Deri.**—HOUSES.—The erection of twenty-four houses at Deri, near Bargoed, for the Cambrian Building Club. Plans and specification may be seen at office of Mr. D. M. Davies, architect, 24, Cardiff-road, Caerphilly, or at the Darran Hotel, Deri.

APRIL 27.—**Horsham.**—RESIDENCE.—For the erection of a cottage residence at Broadbridge Heath, Horsham. The drawings and specifications may be seen at offices of Mr. C. H. Burstow, architect, 6, West-street, Horsham.

APRIL 27.—**Udny.**—ALTERATIONS ON STEADING.—The mason, carpenter, and slater works of alterations on steading at Auchinhuive, Udny. Plans and specifications may be seen at the farm, or with Mr. Wm. Davidson, architect, Ellon.

APRIL 29.—**Cwmdare.**—CHAPEL.—For rebuilding Gobaith Welsh Calvinistic Methodist Chapel, Cwmdare, near Aberdare. Plans and specification can be seen with the Rev. T. Powell, Maesgwyn-terrace, Cwmdare, or at office of Mr. T. Roderick, architect, Ashbrook House, Clifton-street, Aberdare.

APRIL 29.—**Hessle.**—WATER-CLOSETS.—Sculcoates Guardians invite tenders for the substitution of water-closets for the present dry earth closets at the Cottage Homes, Hessle. Specifications and all particulars may be obtained on application to the Guardians' Architect, Mr. T. Beecroft Atkinson, 11, Trinity House-lane, Hull.

APRIL 29.—**Walker, Newcastle-on-Tyne.**—COTTAGES.—Newcastle-upon-Tyne Corporation Housing of the Poor Committee invite tenders for the erection of twelve cottages on the Model Cottage Exhibition Site, Walker. Particulars may be obtained at the City Property Surveyor's Department, Town Hall.

APRIL 30.—**Scarva.**—HALL.—The erection and completion of an Orange Hall at Scarva, Co. Down. Plans and specification can be seen at office of Mr. S. Wilson Reside, architect, Margaret-square, Newry.

APRIL 30.—**Yatton.**—PUMPING STATION, ETC.—Long Ashton R.D.C. invite tenders for the building of a pumping station and caretaker's cottage in connexion with the new water supply for Yatton, in accordance with plans and specification prepared by their Engineer, Mr. A. P. I. Cotterell, M.Inst.C.E., of 28, Baldwin-street, Bristol. The plans may be seen at his office. Copies of the specification, form of tender, etc., may be obtained from the Engineer on payment of the sum of 2*l.* 2s.

APRIL 30.—**Ysgytty Ystwyth.**—RESTORING CHURCH.—For restoring the old church at Ysgytty Ystwyth. Plans and specifications may be obtained on application to the Rev. Sidney A. Jones, the Vicarage, Ystrad Menrig, or to Mr. Davey Jones, Ysgytty Ystwyth, or to the architect. Mr. G. T. Bassett, A.R.I.B.A., architect and surveyor, 17, Terrace-road, Aberystwyth.

MAY 1.—**Clonmel.**—HOSPITALS.—Clonmel District Lunatic Asylum Joint Committee of Management invite tenders for the erection of two consumptive hospitals. Plans and specifications and conditions of contract can be seen at the asylum. Duplicates can also be seen at the offices of Mr. J. F. Fuller, architect, 179, Great Brunswick-street, Dublin. Bills of quantities can be had on payment of 2*l.* 2s.

MAY 6.—**Brighton.**—ADDITIONS TO OFFICES.—Brighton Corporation invite tenders for additions to the Collectors and Account Clerks' Offices at the North-road Electricity Works. The specification, forms of tender, etc., may be obtained on application at the offices of the architect, Mr. Thomas Garrett, No. 30, Ship-street, Brighton, where the plans may also be inspected.

MAY 6.—**Dublin, etc.**—EXTENSION OF RAILWAY OFFICES.—Great Northern Railway Company (Ireland) Directors invite tenders for the following new works: Extension of General Offices, Amiens-street, Dublin; extension of Post-office Rooms, Portadown Station. Drawings and specifications to be seen at the office of Mr. W. H. Mills, Engineer-in-Chief, Amiens-street, Dublin, or copies of them at the office of the District Engineer, Belfast. Lithographed copies of the eight drawings, specification, and form of tender for the Dublin contract on payment of 2*l.* 2s. (not returnable) per set. The drawings for the Portadown contract are not for sale; intending contractors can take particulars from drawings on view. Forms of tender, 1s. each.

NO DATE.—**Bath.**—WORKMEN'S COTTAGES.—The Dunkerton Collieries, Ltd., Peasedown St. John, near Bath, invite tenders for the erection of 100 workmen's cottages upon land adjoining the collieries. Names and addresses to be sent in.

NO DATE.—**Denbigh.**—GRAND STAND.—Tenders are invited for the construction of a grand stand, to accommodate 3,000 to 4,000 spectators. Apply, in first instance, to Hon. Secretary, Finance Committee, Denbigh Pageant, Denbigh.

NO DATE.—**Gosforth.**—SLATING.—For slating at new County Schools, Gosforth. Quantities may be had on application to Messrs. Veitch & Jordan, Barrack-road, Newcastle.

NO DATE.—**Halifax.**—EXTENSION TO WORKS.—The erection of extension to Pelican Metal Works, Spring Hall-lane, Halifax. Plans may be seen, and quantities obtained, at offices of Messrs. Glendinning & Hanson, A.R.I.B.A., Warwick-chambers.

NO DATE.—**Hull.**—SMOKE-HOUSES, ETC.—New smoke-houses, stables, dwelling-house, etc. Apply Messrs. Freeman, Son, & Gaskell, architects, Carr-lane, Hull.

NO DATE.—**Kirkstall.**—ALTERATIONS TO SHOP, ETC.—For alterations to shop and premises (whole tender) in Commercial-road, Kirkstall. Names to Mr. R. Fielding Farrar, A.R.I.B.A., architect and surveyor, 10, Park-row, Leeds.

NO DATE.—**Lochore.**—CO-OPERATIVE INSTITUTION.—The various works proposed to be executed on the erection of Dick's Co-operative Institution, Lochore. Plans may be seen, and schedules of measurements obtained, on application to Mr. James Shearer, architect, 1, Bonnar-street, Dunfermline.

NO DATE.—**Musselburgh.**—ADDITIONS TO SCHOOL.—Musselburgh School Board invite tenders for the work in connexion with additions to the Grammar School. Schedules of quantities may be had on application to Messrs. Lyle & Constable, architects, 5, Hill-street, Edinburgh.

NO DATE.—**Rochdale.**—INFIRMARY EXTENSION.—The extension of Rochdale Infirmary. Names to Messrs. S. Butterworth & Duncan, F.R.I.B.A., Rochdale.

ENGINEERING, IRON, AND STEEL.

APRIL 22.—**Cavan.**—REPAIRING PUMPS.—The R.D.C. of Cavan invite tenders for repairing pumps. Mr. Joseph D. Grier, Clerk of Council.

APRIL 22.—**Coventry.**—CAST-IRON WORK.—Coventry Corporation Gas Committee invite tenders for the supply and erection complete at their Foleshill Works of about 90 tons of cast-iron work comprised in a tank 49 ft. by 25 ft. by 5 ft. 6 in. deep, girders supporting same, and staircases for water tower. Also wrought-iron work in tie-rods, ladders, etc., for above. Copies of specification, etc., will be supplied on application to Mr. Fletcher W. Stevenson, Engineer and General Manager, Gasworks, Coventry, on payment of 1*l*. 1s., which will not be returned.

APRIL 22.—**Gillingham.**—METERS.—Gillingham, Kent, Electricity Committee invite tenders for the supply of meters and demand indicators for the year ending March 31, 1908. Particulars and forms of tender may be obtained on application to the Borough Electrical Engineer, Generating Station, Gillingham-road, Gillingham, Kent.

APRIL 22.—**Glasgow.**—CAST-IRON JOINT BOXES.—Glasgow Corporation invite tenders for the supply of cast-iron joint boxes. Plans and specifications, with form of tender, may be obtained on application to Mr. W. W. Lackie, engineer, 75, Waterloo-street, Glasgow, on making a deposit of 2*l*.

APRIL 22.—**Leeds.**—CAST-IRON PIPES, ETC.—Leeds Corporation Gas Committee invite tenders for the supply of cast-iron pipes, retort castings, etc. Samples may be seen on application at Stores Department, 21, Dewsbury-road, and forms of tender and specification may be obtained on application to Mr. R. H. Townsley, General Manager, Gas Offices, East Parade, Leeds.

APRIL 22.—**Plymouth.**—TRAMWAY TRACK.—Plymouth Corporation invite tenders for reconstructing the tramway tracks in Westwell-street and the corner of Westwell-street and Basket-street. Plans and specifications, and conditions upon which forms of tender will be granted, may be seen at offices of Mr. James Paton, Borough Engineer and Surveyor, Municipal Offices, Plymouth.

APRIL 23.—**London.**—WHEELS, ETC.—The Secretary of State for India in Council is prepared to receive tenders for supply of:—(1) Wheels and axles; (2) springs, spiral; (3) springs, bearing; (4) buffers. The conditions of contract may be obtained on application to the Director-General of Stores, India Office, Whitehall, S.W.

APRIL 23.—**London.**—RAILS, ETC.—Bombay, Baroda, and Central India Railway Company Directors invite tenders for the supply of rails and fish-plates (two contracts). Tenders must be made on forms, copies of which, with specifications, can be obtained at offices of Mr. W. V. Constable, Secretary, Offices, Gloucester House, 2, 3, and 4, Bishopsgate-street Without, London, E.C., on payment of 2ls. each (which will not be returned).

APRIL 23.—**Rotherham.**—HEATING.—Rotherham Corporation invite tenders for heating by hot water on the low-pressure system the corridors, staircases, landings, and lavatories to the offices of the new buildings in course of erection at the top of High-street. Plans may be seen, and further particulars obtained, at the offices of the Corporation Architect (Mr. J. Platts), High-street, Rotherham.

APRIL 23.—**Warrington.**—BOILERS, ETC.—Warrington Electricity and Tramways Committee invite tenders for the following:—(1) Two water-tube boilers and mechanical stokers, also economiser, water-softening plant, iron tank, etc.; (2) coal conveyor; (3) induced draught plant; (4) three-wire ballancer. Specifications may be obtained from Mr. F. V. L. Mathias, A.M.Inst.E.E., Borough Electrical and Tramways Engineer, and drawings seen at the office, Howley, Warrington, on payment of 1*l*. 1s. for each specification.

APRIL 24.—**Manchester.**—BRIDGE REPAIRS.—Manchester Corporation Paving, Sewering, and Highways Committee invite tenders for the repairing of various bridges over the River Medlock. Drawings may be seen, and specification, bill of quantities, and form of tender obtained, on application to the City Surveyor's Office, Town Hall, Manchester, on payment to the City Treasurer of 2*l*. 2s.

APRIL 25.—**Advie.**—BRIDGE WORK.—For the renewal of two spans of the wooden bridge across the River Spey at Advie. Drawings and specifications may be seen, and forms of tender may be had at the County Road Surveyor's office, 24, Academy-street Elgin.

APRIL 25.—**Middleton.**—RETORTS, ETC.—Middleton Gas Committee invite tenders for the supply of:—Two settings of inclined retorts, retort-house governor and tar column, one Livesey washer, cast-iron mains and connexions, 2 in. to 9 in. diameter. Full particulars may be obtained from Mr. J. C. Moon, Gas Engineer, Gas Works, Middleton.

APRIL 25.—**Portsmouth.**—COLUMNS AND BRACKETS.—Portsmouth Corporation invite tenders for the supply and delivery of cast-iron columns and brackets. Specification, drawings, and form of tender can be obtained by applying at the Electric Lighting Station, Gunwharf-road, Portsmouth.

APRIL 30.—**Matlock.**—CABLE TRAMWAY.—Matlock U.D.C. invite tenders for about 1,967 lin. yds. of steel wire tramway cable with Manilla core (3¼ in. in circumference). Further particulars may be obtained upon application to Mr. C. P. Foster, Tramway Engineer and Manager.

APRIL 30.—**Yatton.**—PUMPING MACHINERY.—Long Ashton R.D.C. invite tenders for the provision and erection of pumping machinery, etc., Yatton, in accordance with the specification prepared by their Engineer, Mr. A. P. I. Cotterell, M.Inst.C.E., of 28, Baldwin-street, Bristol, from whom specifications, forms of tender, may be obtained on payment of the sum of 2*l*. 2s.

* MAY 1.—**Ipswich.**—HEATING.—The Ipswich B.C. invite proposals with estimates for warming the wards, etc., of the Fever Hospital. Ground plan, etc., obtainable of Mr. E. Buckham, Town Hall, Ipswich. Estimates to be sent not later than May 1.

MAY 3.—**Luton.**—BOILER, ETC.—Luton T.C. invite tenders for the supply, delivery, and fixing of plant at their Electricity Works, St. Mary's-road, Luton. The whole to be in strict accordance with the plans and specifications, which may be seen at office of Mr. W. H. Cooke, Borough Electrical Engineer, Electricity Works, St. Mary's-road, Luton.

MAY 4.—**Pembroke.**—ELECTRICITY SUPPLY.—Pembroke U.D.C., Co. Dublin, invite tenders for the supply and erection of plant. General conditions, specification, drawings, form of tender, and form of agreement may be inspected at the offices of the Clerk to the Council, Town Hall, Ballsbridge, Co. Dublin, and a copy may be obtained on making a deposit of 3*l*.

MAY 4.—**Shanghai.**—ALTERNATOR.—Messrs. Preece & Cardew are instructed by the Shanghai Municipal Council to invite tenders for the supply and delivery, c.i.f., Shanghai, of the following plant:—One 800 kilowatt horizontal steam-turbo alternator (single phase), with condensing plant. Specification, general conditions, and form of tender, may be obtained from Messrs. Preece & Cardew, 8, Queen Anne's-gate, Westminster, S.W., on payment of a deposit of 2*l*.

MAY 6.—**Felinnewydd.**—IRON BRIDGE.—Aberystwyth R.D.C. invite tenders for the iron and steel work for the iron bridge proposed to be erected across the river Rheidol at Felinnewydd, Cwmrheidol. Plan and specification may be seen at office of Mr. Hugh Hughes, Clerk, 8, Market-street, Aberystwyth.

MAY 10.—**Valetta.**—BOILER AND ENGINE.—The Receiver-General and Director of Contracts, Valetta, invites tenders for the supply of a boiler and engine. Tenders are to be accompanied with a deposit of 50*l*. Particulars, specification, etc., may be obtained on application to the Crown Agents for the Colonies, Whitehall-gardens, London.

MAY 14.—**Hampton.**—REFUSE DESTRUCTOR.—Hampton R.D.C. invite tenders for the provision and construction of a refuse destructor, with boiler, etc., to be erected at their air-compressing station, Hanworth-road, Hampton. Forms of tender, specification of works, and other particulars may be obtained on application to Mr. Sidney H. Chambers, Surveyor to the Council, Surveyor's Department, Public Offices, Hampton, Middlesex.

JUNE 3.—**Callan.**—ELECTRIC LIGHTING.—The Callan Town Commissioners require estimates of probable cost for the erection of plant for the electric lighting of the town. Mr. Michael Kerwick, Town Clerk.

NO DATE.—**Goole.**—CAST-IRON PIPES.—Goole U.D.C. invite tenders for the supply of about 60 tons of 3-in. cast-iron pipes and specials for early delivery. Specifications and any other information required may be had on application from Mr. Thos. E. Franklin, Engineer, Gas and Water Works, Goole.

MISCELLANEOUS.

APRIL 22.—**Brighton.**—ELECTRIC-LIGHT INSTALLATION.—Brighton Corporation invite tenders from local firms for altering the electric-light installation at the Library. The specification and form of tender may be obtained on application to the Chief Librarian, Public Library, Church-street, Brighton.

APRIL 22.—**Glasgow.**—CABLES, ETC.—Glasgow Corporation invite tenders for the supply of:—(1) Main cables; (2) small cables and wires; (3) electricity meters; and (4) arc lamp carbons, for a period of twelve months from May 31. Copies of the specifications and forms of tender may be obtained on application to Mr. W. W. Lackie, engineer, 75, Waterloo-street, Glasgow, on making a deposit of 2*l*. for each specification.

APRIL 23.—**Belfast.**—CUPBOARDS, ETC.—Belfast Library and Technical Instruction Committee invite tenders for cupboards, shelving, etc., for the Textile Department of the Municipal Technical Institute. Drawings and specifications can be obtained on application at the office of the Municipal Technical Institute. A charge of 5s. is made for drawings and specification.

APRIL 24.—**Penzance.**—DREDGING.—Tenders are invited for deepening the entrance to the Penzance Harbour and Dock by dredging, for the Penzance T.C. Conditions, etc., may be seen, and forms of tender obtained, upon application to Mr. Frank Latham, M.Inst.C.E.I., Borough Engineer, Public Buildings, Penzance.

APRIL 24.—**Rochester.**—REMOVAL OF EARTH.—Rochester Corporation invite tenders for the removal of a quantity of excavated earth, now lying on the site of their reservoir at Broom-hill, Strood. Specifications and form of tender can be obtained of Mr. William Banks, A.M.Inst.C.E., City Surveyor, Guildhall, Rochester.

APRIL 25.—**Cannock.**—CARTING.—Cannock R.D.C. invite tenders from ratepayers in the district for carting road material. Particulars and form of tender may be obtained on application to Mr. H. M. Whitehead, District Surveyor, Penkridge.

APRIL 25.—**Edinburgh.**—FURNISHINGS.—For furnishings at new police and fire-station at Saunders-street, Stockbridge, according to plans and specification, which may be seen at the Public Works Office, City-chambers.

APRIL 26.—**Rochester.**—REPAIRS, ETC.—The Rochester and Chatham Joint Hospital Board invite tenders for repairs, painting, whitewashing, etc., at St. William's Hospital, Delce-road, Rochester. Specification may be seen at the offices of Mr. J. E. Bond, architect, Rochester.

APRIL 27.—**Findhorn.**—BOWLING GREEN.—Additional work required at the Findhorn Bowling Green and Lawn Tennis Court. All particulars to be obtained from the architect, Mr. J. Forrest, architect and surveyor, and the plans and specifications to be seen at his office.

MAY 1.—**Erdington.**—FENCING.—Erdington U.D.C. Parks Committee invite tenders for the supply and fixing of 626 lin. yds. of wrought-iron fencing, together with gates at the Park, Erdington. Drawings may be seen, and specifications, etc., obtained, upon application at office of Mr. Herbert H. Humphries, District Engineer and Surveyor, Council House, Erdington.

* MAY 6.—**Portsmouth.**—VENTILATING.—The Portsmouth B.C. invite tenders for ventilating the Council Chambers in Town Hall (for further particulars see advertisement in this issue). Tenders, endorsed "Ventilating Council Chambers," to be delivered at the Town Hall not later than 10 a.m., May 6.

* MAY 7.—**Leytonstone.**—LIBRARY FURNITURE, ETC.—The Leytonstone U.D.C. invite tenders for the supply of furniture and fittings required at the branch library, Park House, Leytonstone, N.E. (for particulars see advertisement in this issue). Sealed tenders, in envelopes supplied, to be delivered at the meeting of the Library Committee, at the Town Hall, at 7.15 p.m. on May 7.

NO DATE.—**Tondu.**—BOREHOLES.—For putting down two boreholes, Tondu District. For particulars apply Messrs. Ifitid Thomas & Jenkin, Castle-square, Swansea.

PAINTING, etc.

APRIL 22.—**Halifax.**—PAINTING.—Halifax Improvement Committee invite tenders for painting work at Waterloo Villas. Specifications may be seen, and forms of tender obtained, on application to Mr. James Lord, M.Inst.C.E., Borough Engineer, Town Hall, Halifax, upon payment of the sum of 1*l*.

APRIL 22.—**Rochdale.**—PAINTING.—The painting of the exterior of seventeen houses in Ashfield-road, Rochdale. For specification write to Mr. J. Nicholl, 215, Ashfield-road.

APRIL 23.—**Leeds.**—CLEANING, ETC.—Leeds Property Committee invite tenders for cleaning down, painting, and decorating the exterior of, and various rooms, offices, and corridors, in the Town Hall, Leeds. Forms of tender and schedules may be obtained from Mr. W. T. Lancashire, City Engineer, Municipal Buildings, Leeds, on payment of a deposit of 2*l*. 2s.

APRIL 23.—**Southend-on-Sea.**—PAINTING.—The Education Committee invite tenders for the external painting of the Brewery-road and Southchurch Hall Council Schools. Specifications can be seen, and forms of tender obtained, at the office of Mr. W. Y. Hobbiss, architect, Weston-chambers.

APRIL 24.—**Grays.**—PAINTING.—The U.D.C. of Grays Thurrock invite tenders for external painting at the fire station in Orsett-road. Specification may be seen at the office of the Council's Surveyor, High-street.

APRIL 26.—**Haywards Heath.**—PAINTING.—The Visiting Committee of the Brighton County Borough Asylum invite tenders for painting the exterior of the asylum buildings. Specification and form of tender can be obtained on application at the offices of the Surveyor to the Asylum, Mr. J. G. Gibbins, F.R.I.B.A., of the firm of Messrs. J. G. Gibbins & Son, architects and surveyors, 3, Palace-place, Brighton.

APRIL 30.—**Brighton.**—PAINTING.—Brighton Guardians invite tenders for painting the exterior of the Brighton Workhouse in Elm-grove and the Warren Farm Schools, near Brighton. Copies of specifications, etc., may be obtained at office of Mr. B. Burfield, Clerk to the Guardians, Parochial Offices, Prince's-street, Brighton.

APRIL 30.—**London.**—PAINTING, ETC.—Poplar and Stepney Sick Asylum District Managers invite tender for painting and cleansing work at the Blackwall Branch Asylum. Specification at offices of the architects, Messrs. J. & W. Clarkson, 136, High-street, Poplar, London, E., upon payment being made to them of a deposit of 2*l*.

* APRIL 30.—**Poplar.**—PAINTING AND CLEANING.—The Managers of the Poplar and Stepney Sick Asylum District invite tenders for painting and cleansing work at Blackwall Branch (for particulars see advertisement in this issue). Tenders, sealed, and endorsed "Tender for Painting at Blackwall Branch Asylum," to be delivered to the Clerk to the Managers, Poplar and Stepney Sick Asylum, Devons-road, Bromley, Middlesex, not later than 10 a.m., April 30.

APRIL 30.—**Southend-on-Sea.**—PAINTING.—Southend-on-Sea Corporation invite tenders for the cleaning and painting of the exterior of the workmen's dwellings, Ruskin-avenue, Southend-on-Sea. Particulars and specification may be obtained upon application to Mr. E. J. Elford, M.Inst.M.E., Borough Engineer, Southend-on-Sea (on deposit of cheque for 1*l*. 1s.).

* MAY 1.—**Kent.**—PAINTING, ETC.—The Metropolitan Asylums Board invite tenders for painting and cleaning works at Darenth Asylum, Dartford, Kent (for particulars see advertisement in this issue). Tenders, addressed as noted on form, to be delivered at the office of the Board not later than 10 a.m., May 1.

MAY 1.—**Liverpool.**—PAINTING.—Liverpool Select Vestry invite tenders for painting (according to a specification which may be seen at office of Mr. H. J. Hagger, Vestry Clerk, Parish Offices, Brownlow-hill) of the wood and iron work of the buildings in Westminster-road, Kirkdale, formerly known as the Industrial Schools.

* MAY 1.—**Tottenham.**—PAINTING, ETC.—The Metropolitan Asylums Board invite tenders for cleaning and painting works at the North-Eastern Fever Hospital, St. Anne's-road, Tottenham, N. (for particulars see advertisement in this issue). Tenders, endorsed as noted on forms, to be delivered at the office of the Board not later than 10 a.m. on May 1.

* MAY 6.—**Portsmouth.**—CLEANING, ETC.—The Portsmouth B.C. invite tenders for cleaning,

painting, and decorating the Council Chamber at the Town Hall (for particulars see advertisement in this issue). Tenders, endorsed "Tender for Decorating," to be delivered at the Town Hall not later than 10 a.m., May 6.

MAY 13.—**York.**—PAINTING.—York Education Committee invite tenders for painting and limewhiting schools. Specifications may be obtained of the Secretary, Education Offices, Clifford-street, York.

NO DATE. — **Fratton.** — PAINTING.—For external painting to forty-two houses, Byerley-road, Fratton. Bill of quantities and specification and further particulars may be obtained from Messrs. G. & H. Farminer, Denby House, King's-road, Gosport.

ROADS, SANITARY, AND WATER WORKS.

APRIL 22.—**Edinburgh.**—ROAD WORKS.—Edinburgh Corporation invite estimates for macadamising and channelling, etc., portion of the carriageway of Dickson-street (from Dalmeny-road northward). Schedules of quantities may be obtained on application to the City Road Surveyor, City-chambers.

APRIL 22. — **Plymouth.** — MAKING-UP. — Plymouth Corporation invite tenders for making-up and completing streets and lanes. Plans and specifications, and conditions upon which forms of tender will be granted, may be seen at offices of Mr. James Paton, Borough Engineer, Municipal Offices, Plymouth.

APRIL 22.—**Rosskeen.**—SEA WALLS.—The repair and extension of the Rosskeen sea walls, near Invergordon. Plans and specification may be seen with, and schedules of quantities obtained from, Messrs. Geo. Gordon & Co., civil engineers, Inverness.

APRIL 22.—**Tilbury.**—PAVING.—Orsett Advisory Sub-committee invite tenders for paving at Tilbury Schools. Plans and specifications may be seen at the office of Mr. Christopher M. Shiner, A.R.I.B.A., architect, the Gate House, Grays.

APRIL 23. — **Cavan.** — ROAD MAINTENANCE.—Mullahoran R.D.C. (Co. Cavan) invite tenders for road maintenance. Specifications can be seen, and forms of tender obtained, at office of Mr. John Kiernan, Clerk of D.C., D.C. Office. A deposit of 2s. 6d. must be lodged for each tender.

APRIL 23.—**Gateshead.**—STREETS.—Gateshead Corporation invite tenders for paving, etc., the following streets, viz.:—Beaconsfield-avenue (part of), Low Fell; back Cuthbert-street, back Cemetery-road, back Tyne-road East (remainder of). Plans and specifications may be seen, and quantities obtained, at the office of Mr. N. P. Pattinson, Borough Engineer, Town Hall.

APRIL 23. — **Penrhiwceiber.** — SEWER.—Mountain Ash U.D.C. invite tenders for the construction of a sewer, with the necessary manholes, etc., at Penrhiwceiber. Plans and specification may be seen, and forms of tender and bills of quantities obtained, at the office of the Council's Surveyor, Mr. W. G. Thomas, Town Hall, Mountain Ash.

APRIL 24.—**Birstall.**—ROAD WORKS.—The U.D.C. of Birstall invite tenders for the levelling, paving, flagging, and completing of Union-street. Plans, sections, and specifications of the said work may be seen on application to the Council's Surveyor, Mr. Arthur Walker.

APRIL 24.—**Erdington.**—ROAD WORKS.—Erdington U.D.C. Highways and Buildings Committee invite tenders for levelling, surface-water draining, metalling, channelling, paving, and making good Albert-road, Gladstone-road, Silverbirch-road, and Victoria-road. Drawings may be seen, and specifications, etc., obtained, upon application at office of Mr. Herbert H. Humphries, District Engineer and Surveyor, Council House, Erdington.

APRIL 24. — **Erdington.**—STREET WORKS.—Erdington U.D.C. Highways and Buildings Committee invite tenders for excavating and remaking the macadamised margins of the carriageway in Gravelly Hill, etc. Drawings may be seen, and specifications, etc., obtained, upon application at office of Mr. Herbert H. Humphries, District Engineer and Surveyor, Council House, Erdington.

APRIL 25.—**Milton.**—SEWERAGE.—Weston-super-Mare U.D.C. invite tenders for the works of sewering Milton. Names and addresses to Mr. S. C. Smith, Solicitor, Clerk to the U.D.C., Town Hall, Weston-super-Mare, together with a deposit of 10*l.*

APRIL 26. — **Kendal.** — SEPTIC TANK, ETC. — Kendal Corporation invite tenders for the construction of septic tanks and grit and screening chambers, etc., at the Sewage Disposal Works. Drawings and specifications may be seen, and bills of quantities obtained, on application at the office of Mr. F. W. Oxberry, Borough Engineer and Surveyor, Town Hall, Kendal.

APRIL 26.—**Porth.**—ROAD WORKS.—Rhondda U.D.C. invite tenders for the works in connexion with the widening and improvement of road at the bottom of Tynewydd Hill, Porth. Plans may be seen, and forms of tender obtained, at the office of the Engineer and Surveyor, Council Offices, Pentre, Rhondda, on payment of a sum of 1*l.* 1s.

APRIL 26.—**Ystrad Rhondda.**—ROAD WIDENING.—Rhondda U.D.C. invite tenders for road widenings, etc., at Ystrad Rhondda. Plans may be seen, and forms of tender obtained, at the office of the Engineer and Surveyor, Council Offices, Pentre, Rhondda, on payment of a sum of 1*l.* 1s.

APRIL 27. — **Alcester.**—BURIAL GROUND.—Alcester P.C. invite tenders for the drainage and levelling of the site, erecting walls and fences, and the making of footpaths in connexion with the provision of a new burial ground at Alcester, the whole to be carried out in accordance with plans prepared by Messrs. T. P. & F. F. Baylis, of Droitwich and Redditch. The drawings and specifications may be seen at the offices of Mr. F. F. Baylis, Unicorn Hill, Redditch, from whom all particulars may be obtained.

APRIL 27. — **Clewer.** — STREET WORKS. — Windsor R.D.C. invite separate tenders for the making-up of those parts of Elm and Springfield roads which are situate in the Parish of Clewer. Plans and specifications may be seen at office of Mr. J. E. Gale, Clerk, 3, Sheet-street, Windsor.

APRIL 27 — **Edinburgh.** — PIPES.—Edinburgh and District Water Trustees invite tenders for providing and delivering about 120 tons of dry sand cast-iron pipes, 9 and 6 in. diameter. Copies of the specification and schedule may be obtained at the office of the engineer, Mr. W. A. Tait, C.E., 72A, George-street, Edinburgh, on payment of 1*l.*

APRIL 27.—**Edinburgh.**—TANK AND MAINS.—Edinburgh and District Water Trustees invite tenders for constructing concrete tank at Barntonhill and cutting track for and laying and jointing cast-iron and fireclay pipes in connexion therewith. Plans may be seen, and copies of the specification and schedule obtained, at the office of the engineer, Mr. W. A. Tait, C.E., 72A, George-street, Edinburgh, on payment of 1*l.*

APRIL 27. — **Queenborough.** — WATERWORKS.—The T.C. of Queenborough invite tenders for the construction of a hennebique ferro-concrete reservoir and brick-built engine-house at Rushenden, near Queenborough, Kent, supply and fixing of a complete air-lift pumping plant, and the supply and laying of cast-iron pipes, special valves, castings, etc., in accordance with plans, etc., which can be seen at the office of Mr. Horatio Small, Borough Surveyor, Queenborough, where forms of tender can also be obtained.

APRIL 27.—**York.**—SEWERS, ETC.—Laying of about 400 yds. of 9-in. sewers and the building of manholes, etc., on the "Southlands Building Estate," Bishopthorpe-road, for Mr. Ward Cartman. Plans and sections may be seen, and specifications and quantities obtained, on application to Mr. George H. Pegg, architect and surveyor, 23, Spurriergate, York.

APRIL 29. — **Hertford.**—MAKING-UP ROADS.—Hertford Corporation invite tenders for making-up the following private streets, viz.:—Tamworth-road (part of), Cross-road. The drawings and draft contract may be seen, and a copy of the specification, etc., obtained, at the office of the Borough Engineer, Mr. John Henry Jevons, A.M.Inst.C.E., The Wash, Hertford, upon payment of 3*l.* 3s.

APRIL 29.—**Hertford.**—WATER MAIN.—Hertford Corporation invite tenders for providing, laying, and jointing about 350 yds. of 4-in. cast-iron water main, together with sluice valves, hydrants, and other work in connexion therewith. Particulars and form of tender may be obtained at the Borough Surveyor's office on payment of 2*l.* 2s.

APRIL 29. — **Sevenoaks.** — STREET WORKS. — The U.D.C. of Sevenoaks invite tenders for the levelling, metalling, kerbing, tar paving, foothpaths, channelling, and making good of Greatness-road and Grove-road, Sevenoaks. Plans, etc., may be inspected, forms of tender, and further information obtained, at the offices of Mr. S. Towlson, A.M.Inst.C.E., Surveyor to the Council, upon payment of a cash deposit of 5*l.*

✱ APRIL 30. — **Ealing.**—STREET IMPROVEMENT.—The Ealing T.C. invite tenders for making-up certain roads (for particulars see advertisement in this issue). Sealed tenders, endorsed "Tender for Making-up ——," to be delivered at Town Clerk's office, Town Hall, Ealing, W., not later than 9.30 a.m. on April 30.

APRIL 30. — **Worthing.** — TAR PAVING.—Worthing Corporation invite tenders for supplying and laying about 1,900 super. yds. of tar paving on the East Parade. Particulars may be obtained, together with form of tender, on application at the offices of Mr. Frank Roberts, A.M.Inst.C.E., Borough Engineer and Surveyor.

APRIL 30.—**Yatton.**—WATER SUPPLY.—Long Ashton R.D.C. invite tenders for pumping machinery, at the new Waterworks Pumping Station, in accordance with the specification prepared by their Engineer, Mr. A. P. I. Cotterell, M.Inst.C.E., of 28, Baldwin-street, Bristol. Contractors are to submit their own designs in compliance with the terms of the specification, copies of which, together with forms of tender, may be obtained from the Engineer on payment of the sum of 2*l.* 2s.

MAY 1. — **Sheffield.** — SETTLING TANKS, ETC. — Sheffield Highway and Sewerage Committee invite tenders for the construction of six settling tanks (1,000,000 galls. each), twenty-four (half acre) contact beds (floors excepted), conduits and culverts, reconstruction of storm-water culvert, and other contingent works at the Sheffield Sewage Works, Wincobank, near Sheffield. Drawings may be inspected, and copies of the conditions of contract, etc., obtained, at the office of Mr. Charles F. Wike, City Surveyor, Town Hall, Sheffield, on payment of 2*l.*

MAY 3.—**Amersham.**—WATER MAINS.—Amersham, Beaconsfield, and District Waterworks Company, Ltd., invite tenders for laying about three miles of 4-in. cast-iron water pipes, valves, etc., from Amersham to Chalfont St. Giles, in the County of Buckingham. Specifications and conditions, with forms of tender, may be obtained from the Managing Director of the Company, Mr. H. J. Johnston, Beaconsfield, upon depositing 1*l.* 1s.

MAY 4.—**Bolton-upon-Dearne.**—ROAD IMPROVEMENTS.—Bolton-upon-Dearne U.D.C. invite tenders for improvements on the Doncaster and Saltersbrooke main road, Goldthorpe. Specification, etc., may be obtained from the Surveyor, Council Offices, Station-road, Bolton-upon-Dearne, Rotherham, upon a deposit of 10s.

MAY 7.—**Denby Dale.**—DRAINAGE.—Denby and Cumberworth U.D.C. invite tenders for the supply of materials and construction of about 235 lin. yds. of 12-in., 9-in., or 6-in. cast-iron, and 4,818 lin. yds. of 12-in., 9-in., or 6-in. fireclay pipe sewers, together with manholes, lampholes, etc., complete. Drawings may be seen, and specification, etc., obtained, at the offices of Messrs. C. H. Marriott, Son, & Shaw, civil engineers, Church-street-chambers, Dewsbury, on payment of a deposit of 2*l.* 2s.

✱ MAY 9.—**Stroud.**—SEWERAGE.—The Stroud R.D.C. invite tenders for certain sewerage work (for particulars see advertisement in this issue). Sealed tenders, endorsed "Tender for Painswick Sewerage," to be delivered to the Clerk, 5, Rowcroft, Stroud, Glos., before noon on May 9.

MAY 11. — **Bruxelles.** — SYPHONS. — The Société Anonyme du Canal et des Installations Maritimes de Bruxelles (Brussels Canal and Maritime Installations Company) will open tenders on May 15 at their head office, 59, Rue du Canal, Brussels, for the demolition of the three-hole syphon and of the six-hole syphon, and for the construction of a new syphon under the Willebroeck Canal. Contractors may examine the plans, measurements, terms, and conditions at said address.

MAY 18. — **Stretford.** — STREET WORKS.—Stretford U.D.C. invite tenders for paving with granited rock asphalt, etc. The drawings, etc., may be seen, and forms of tender, with schedule of quantities and other particulars, obtained, on application to Mr. Ernest Worrall, the Council's Surveyor, Council Offices, Old Trafford, on payment of a deposit by cheque of 2*l.* 2s.

NO DATE. — **Lincoln.** — STREET MAKING. — For making Tealby-street, St. Botolph's, Lincoln, and pulling down Old Maltkiln. Names to Messrs. Andrew & Thompson, solicitors, Lincoln.

STONE, MATERIALS, AND STORES.

APRIL 22. — **Glasgow.** — MATERIALS.—Glasgow Corporation invite tenders for the supply of materials, and also for the carting. Forms of tender and particulars may be obtained on application to Mr. W. W. Lackie, engineer, 75, Waterloo-street, Glasgow.

✱ APRIL 23. — **Edmonton.**—STONEWARE PIPES.—The Edmonton U.D.C. invite tenders for supply and delivery of stoneware pipes (for particulars see advertisement in this issue). Sealed tenders on form supplied, endorsed "Tender for Stoneware Pipes," to be delivered to the Clerk to the Council, Town Hall, Edmonton, not later than 12 o'clock, April 23.

APRIL 23. — **Samford.**—GRANITE.—Samford R.D.C. invite tenders for the supply of 500 tons 1½-in. broken granite. Samples to be delivered at the Workhouse, Tattingstone. Tenders to be delivered to the Clerk to the Council, 54, Princes-street, Ipswich.

APRIL 24. — **Erdington.** — MATERIALS.—Erdington U.D.C. Highways and Buildings Committee invite tenders for the supply of materials, etc., for the year ending March 31, 1908. Copies of the specifications, etc., may be obtained at the office of Mr. Herbert H. Humphries, Surveyor to the Council, Council House, The Park, Erdington.

APRIL 24.—**Southwark.**—WOOD BLOCKS.—Southwark B.C. invite tenders for the supply of 425,000 Jarrah wood blocks, 3 in. by 9 in. by 4½ in. Further particulars and printed specifications may be obtained at the office of the Borough Engineer, Town Hall, Walworth-road, S.E.

APRIL 24.—**Thame.**—GRANITE.—The U.D.C. of Thame invite tenders for the supply of 1,100 tons of broken granite, 100 tons of granite chippings. Forms of tender may be obtained from Mr. William Parker, Clerk, No. 2, High-street, Thame, or from the surveyor, Mr. H. Howland, 17, Chinnor-road, Thame.

APRIL 25.—**Glasgow.**—MATERIALS.—Glasgow Corporation invite tenders for the supply of materials. Specifications and forms of tender may be had on application to Mr. D. M'Coll, Superintendent of Cleansing, 38, Cochrane-street, Glasgow.

APRIL 25.—**Glasgow.**—STORES.—Glasgow P.C. and Lunacy District Board invite tenders for the supply of goods to Barnhill Poornouse, Stobhill, Eastern and Western District Hospitals, Woodilee and Gartloch Asylums, Laboratory, and offices. Forms for tenders may be had, and all particulars given, on application to Mr. Jas. R. Motion, Inspector and Clerk, at the chambers of the Council, 266, George-street.

APRIL 25. — **Kingsbridge.** — ROAD MATERIAL. — Kingsbridge R.D.C. invite tenders for the supply of unbroken limestones, broken limestones, flints, broken Trevollard or Forder stones, and Trevollard or Forder chippings. Further particulars may be obtained on application to Mr. William Beer, Clerk, Kingsbridge.

APRIL 25.—**Wallsend.**—MATERIALS, STORES, ETC.—Wallsend Corporation invite tenders for the supply of articles from the date of acceptance of tender until March 31, 1908. Samples and quantities of each article required may be had on application at the Corporation Offices, Hugh-street, Wallsend.

APRIL 27.—**Perth.**—SUPPLIES.—Perth T.C. invite tenders for the supply of whinstone, causeway, kerb, channel, etc.; fireclay drain pipes, traps, etc. Specifications and forms of tender may be had at the Burgh's Surveyor's office, 16, Tay-street, Perth.

APRIL 29.—**Dover.**—ROAD MATERIALS.—The T.C. invite tenders for the supply of road materials. Specification and forms of tender may be obtained at office of Mr. Wollaston Knocker, Town Clerk, Town Clerk's Office, Castle Hill House, Dover.

APRIL 29.—**Hebburn.**—DISINFECTANTS.—The U.D.C. of Hebburn invite tenders for the supply of disinfectants during the ensuing six months. Form of tender will be forwarded on application to Mr. Thomas Stuart, Clerk to the Council, 7, Bell-street, Hebburn.

APRIL 29.—**Hertford.**—STORES.—Hertford Corporation invite tenders for the supply of oil, waste, water-fittings, brooms, shovels, slop-scoops, gulley grates, manhole-tops, etc. Form of tender and other particulars may be obtained at the Borough Surveyor's Office.

APRIL 29. — **Ogmore.** — STONEWARE PIPES.—Ogmore and Garw U.D.C. invite tenders for the supply and delivery of stoneware pipes of various sizes and other stoneware goods for a term of twelve months. Further particulars and form of tender may be obtained on application at the Council's Offices, Brynmenyn.

APRIL 29.—**Wishaw.**—WHIN METAL.—Supply of about 1,500 tons Whin metal for the year 1907-08. Specifications and schedules can be obtained by applying to Mr. William Rodger, Burgh Surveyor, Wishaw.

APRIL 30.—**Uckfield.**—ROAD MATERIAL.—Uckfield U.D.C. invite tenders at per yard for road materials. Forms of tender to be obtained on application at the offices of the Council.

MAY 1. — **Uttoxeter.** — ROAD MATERIAL, ETC.—Uttoxeter R.D.C. invite tenders for road material and team work. Forms of tender can be obtained from Mr. G. E. Mullard, surveyor, High-street, Uttoxeter.

MAY 3.—**Glasgow.**—MATERIALS.—Glasgow Corporation invite offers for materials and jobbing work required in the various departments (hospitals excepted). Specifications and forms of offer may be obtained on application at the office of Public Works, City Chambers, 64, Cochrane-street.

✱ MAY 3.—**Glasgow.**—PAVING STONES.—The Glasgow Corporation invite tenders for supply of certain paving stones (for particulars see advertisement in

this issue). Sealed tenders, endorsed "Statute Labour and Tramways Department, Tender for ——," and sample stones (to be delivered six days previously) to be sent to the Town Clerk, City Chambers, Glasgow, not later than May 3.

MAY 4.—**Bosmere and Claydon.**—GRANITE.—The R.D.C. of Bosmere and Claydon invite tenders for granite, picked stones, pit stones. Particulars of estimated quantities required, and forms of tender and contract, on application to Mr. George Fiske, surveyor, Red House, Coddenham, Ipswich.

MAY 7.—**Richmond.**—STORES.—Richmond Main Sewerage Board invite tenders for the supply of stores required at their works, Kew Gardens. Specifications and forms of tender may be obtained on application at the office of the Engineer to the Board, West Hall-road, Kew Gardens, S.W., on payment of 10s. for each specification.

Public Appointments.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
•ASSISTANT ENGINEER	Public Wk. Dpt., Hong Kong	360*l.*, etc.	April 27
•DRAUGHTSMAN	Borough of Poole	2*l.* per week	No date

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
•FREEHOLD BUILDING SITE, NOTTING HILL, W.—At the Mart	Henry H. Collier & Madge	April 22
•RESIDENTIAL PROPERTY, CHILD'S HILL—At the Mart	Furber	April 24
•DEALS, BATTENS, ETC.—Great Hall, Winchester House, Old Broad-street, E.C.	Churchill & Sims	do.
•103 AND 103A, OXFORD-STREET, W.—At the Mart	May & Rowden	April 26
•FREEHOLD BUILD. LAND, FRIERN BARNET—At the Torrington Arms Hotel, N. Finchley	Charles Sparrow & Son	April 29
•FREEHOLD BUILDING LAND, FINCHLEY—At the Torrington Arms Hotel, N. Finchley	Charles Sparrow & Son	do.
•FREEHOLD BUILDING SITE, HANWELL—At the Mart	C. Rawley, Cross, & Co.	April 30
•FREEHOLD BUILDING LAND, TOOTING COMMON—At the Mart	Hampton & Son	do.
•TILE, ETC., MERCHANT'S STOCK—At L. & N. W. Ry. Co.'s Goods Depot, Worship-st., E.C.	Benjamin Norman	May 1
•FREEHOLD RIVERSIDE PROPERTY, NORTHFLEET—At the Mart	Edwin Fox & Bousfield	do.
•FIVE FREEHOLD BUILDING PLOTS, SURREY—At the Red Lion Hotel, Dorking	White & Sons	May 2
•BUILDING SITE, ALDERSGATE-STREET, E.C.—At the Mart	Reynolds & Eason	May 4
•FREEHOLD BUILDING SITE, ELSTREE—At the Mart	Holcombe, Betts, & West	May 6
•BUSINESS PREMISES, FINSBURY—At the Mart	Ferris & Puckridge	May 10
•FREEHOLD BUILDING ESTATE, ELTHAM, KENT—At the Mart	Woods & Snelling	May 14
•BUILDING LEASE, ALDERSGATE-STREET, E.C.—At the Mart	Reynolds & Eason	do.
•SITES FOR COUNTRY RESIDENCES, SUSSEX—At the Mart	Tyler & Co.	May 27
•FREEHOLD BUILDING ESTATE, CLAPHAM COMMON—At the Mart	Thurgood & Martin	June 20

PATENTS.—*Continued from page* 487.

lower portions of adjacent plates respectively, each of the said plates being furnished with a round draught hole in the upper portion thereof protected on the exterior by a lean-to hood of rectangular section, in such manner that the plates may be made to engage one with the other by virtue solely of their form to make up a stable chimney-pot.

22,695 of 1906.—J. NAGY: *Bridge Girders for Travelling Cranes.*

This relates to a bridge for travelling cranes comprising vertical beams or girders between which the travelling truck travels, and a horizontal girder frame connected with the vertical girders in such manner as to resist only lateral strains.

24,006 of 1906.—J. PARKER, JUN.: *Domestic Fireplaces or Cooking Ranges.*

This relates to domestic fireplaces or cooking ranges and consists in the combination of a flame flue, a sliding shutter or damper, an ash-tray and chamber, and a hot chamber hollow.

27,662 of 1906.—G. HELBLING and THE DECO AKT. GES VORMALS, G. HELBLING & CO., and THE LEEDS FIRECLAY CO., LTD.: *Water-closet Basins.*

This relates to the construction of closet with a ventilating pipe or channel behind the back part of the bowl, carried up to the highest possible point immediately below the supply entrance, and carried down to the lowest possible point below and behind the suction pipe, and terminating level with the outlet of the suction pipe.

28,293 of 1906.—R. B. PARSONS: *Window-Sash Fastener.*

This relates to a window-sash fastener, and consists of a bolt enclosed within a casing which is secured by screws to the transom bar of the bottom sash. This bolt is furnished with a head protruding through the casing, the opposite end having a knob or handle screwed thereon, whilst to ensure that the bolt effects its purpose at all times it is encircled by a spiral spring one end of which abuts against a shoulder formed on the bolt head and the other end against the end of the casing so as to have a constant tendency to force said bolt outwards and cause the head to engage with a socket secured by screws to the transom bar of the top sash. By this means it will be seen that when the window is closed the fastener locks the sashes automatically, whilst to part them the knob is simply drawn back. In order to prevent the window being opened from the outside there is made a slot or recess in the underside of the bolt head, so that if a knife or the like instrument is inserted between the two sashes with the object of forcing the bolt back the slot effectually prevents this being done owing to the end of the knife-blade entering the said recess.

28,390 of 1906.—F. J. CARL and H. G. CARL: *Window Sashes.*

This relates to a window-sash, and consists in the combination with the vertically sliding and horizontally swinging sash of a stop normally in position to arrest the upward movement of the lower sash preparatory to swinging it open, and adapted to be moved out of the way of the sash at will.

28,594 of 1906.—W. HOLTHAUS: *Inwardly Opening Fanlight or Skylight.*

This relates to an inwardly opening skylight comprising in combination with the stationary frame and the movable flap an intermediary movable frame hinged to said stationary frame so as to open sideways, said flap being hinged to said movable frame, and capable of partly opening therefrom at the top.

29,200 of 1906.—W. DUNG: *Homogeneous Composition Floors and the like.*

This relates to jointless composition flooring, and consists in first laying the portions of the flooring intervening between the main supports thereof and subsequently joining the same together by laying composition over the main supports in such manner as to form a homogeneous floor surface free from cracks or fissures.

2,000 of 1907.—W. OATES: *Lavatory Basins and the like.*

This relates to a lavatory basin or the like in which the water or other matter is conducted into a troughing leading to the drain, or to the drain direct, by means of an open-fronted vertical channel.

10,244 of 1906.—W. N. SHOTT: *Manufacture of Blocks, Tiles, or Slabs for Paving and other purposes.*

This relates to the manufacture of a material by the admixture of a hard substance like stone with granulated wood, stone dust, or fine sand with Trinidad, Lake, or other asphalt to get a pavement which does not produce dust, is very durable, resilient, non-friable, non-slipping, silent, and perfectly sanitary.

12,411 of 1906.—A. J. BOULT ("LA PIOMBIFERA" SOCIETA ANONIMA ITALIANA PER L'INDUSTRIA DEL PIOMBO E GENERI AFFINI): *Siphon Traps.*

This relates to a siphon trap having an hydraulic seal in which the difference of level between the two bends is reduced to a minimum, the second band being very narrow to enable solid material to fall direct into the sewer, while the portion extending from the centre of the discharge hole to the top of the bed is constituted by an inclined plane.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

April 8.—By JONES, LANG, & Co.

King's Cross.—9, Albion-st., f., y.r. 36*l.*	£525
19 to 33 (odd), Albion-st., f., y.r. 324*l.*	4,395
35, Albion-st., (s), f., y.r. 44*l.*	550
York-rd. and Railway-st., f.g.r. 172*l.*, reversion in 47 yrs., and 26¾ yrs.	5,200

By GREEN & SON (at Hammersmith).

Hammersmith.—20, 21, 22, and 23, Munden-st., u.t. 15 yrs., g.r. 48*l.*, w.r. 166*l.*	£170

April 9.—**By C. A. NICOLL.**

Camberwell.—57, Arthur-st., f., w.r. 36*l.*	350

RAMSAY, WAINWRIGHT & Co.

Holloway.—53, Corbyn-st., u.t. 60 yrs., g.r. 4*l.* 10s., e.r. 34*l.*	310

By TYLER & Co.

Chiswick.—1, Swanscombe-rd., u.t. 72 yrs., g.r. 6*l.* 10s., e.r. 40*l.*	210
Hampstead.—8, 9, 10, and 11, St. Thomas's-gdns., u.t. 42 yrs., g.r. 20*l.*, y.r. 126*l.*	995

By WILTSHIRE & Co.

Lee.—18, Church-ter., f., y.r. 45*l.*	535

By JAMES T. PEAT (at Reigate).

Reigate, Surrey.—8, 10, and 12, Warren-rd., f., w.r. 68*l.*	735
Furzefield-cres., freehold plot of building land	140
108, Station-rd., profit rental of 20*l.* per annum	100

By BRODIE, TIMBS, & Co. (at Middlesbrough).

Middlesbrough, Yorks.—Linthorpe Estate, 36 plots and a two-acre field, f.	4,193

April 10.—**By DAVID BURNETT & Co.**

Cricklewood.—116, The Broadway (s.), u.t. 72½ yrs., g.r. 6*l.*, y.r. 60*l.*	860
Croydon.—18, Warham-rd., f., e.r. 65*l.*	720
Walthamstow.—Fulbourne-rd., f.g.r. 20*l.*, reversion in 92 yrs.	380

By PARKHOUSE & PEARSON.

Edgware-road.—51 and 55, Star-st., u.t. 25 yrs., g.r. 12*l.* 10s., y.r. 90*l.*	650
73, 74, and 75, Star-st., u.t. 23 yrs., g.r. 19*l.*, w.r. 85*l.*	330
Bayswater.—33, Archer-st. (s.), u.t. 43 yrs., g.r. 8*l.*, w.r. 83*l.*	330

By T. D. PEACEY.

Hampstead.—56, Adelaide-rd., u.t. 36 yrs., g.r. 7*l.* 10s., e.r. 60*l.*	410

By RUSHWORTH & BROWN.

St. John's Wood.—38, Ordnance-rd., u.t. 27¾ yrs., g.r. 12*l.*, p.	270

By DOUGLAS YOUNG & Co.

Bromley, Kent.—11 and 12, South-st., u.t. 60 yrs., g.r. 6*l.* 18s. 4d., q.r. 48*l.*	420
Battersea.—67, 69, and 71, Savona-st., f., w.r. 93*l.*	760
Chelsea.—120, 122, and 124, Lots-rd., u.t. 41 yrs., g.r. 6*l.*, w.r. 135*l.*	750
1A, Tetcott-rd., u.t. 41 yrs., g.r. 5*l.*, w.r. 44*l.*	225

April 11.—**By BROWETT & TAYLOR.**

Forest Hill.—Canonbie-rd., "Wilton House," f., e.r. 65*l.*	650
South Norwood.—Park-rd., f.g.r. 8*l.*, reversion in 80 yrs.	170
51 to 65 (odd), Bungalow-rd., f., w.r. 197*l.* 12s.	1,810
146 to 162, 196 to 208, 218 to 224, and 234 to 240 (even), Holmesdale-rd., f., w.r. 551*l.* 4s.	4,555
91 to 105 (odd), Whitehorse-la., f., w.r. 167*l.* 14s.	1,110
59 to 69 (odd), Whitehorse-la., f., w.r. 124*l.* 16s.	885
71 and 73, Whitehorse-la., f., w.r. 41*l.* 12s.	270
72 to 88 (even), Whitehorse-la., f., w.r. 140*l.* 8s.	1,170
Whitehorse-la., laundry and warehouse premises, f., w.r. 36*l.* 8s.	110
158, Clifton-rd. (off-license), f., y.r. 35*l.*	720
156, Clifton-rd. (s.), f. w.r. 18*l.* 4s.	200
118 to 132 (even), Clifton-rd., f., w.r. 124*l.* 16s.	865
105 to 113 (odd), Clifton-rd., f., w.r. 117*l.* 4s.	810
131 and 131A, Clifton-rd. (s.), f., w.r. 28*l.* 12s.	210
Thornton Heath.—77, Brigstock-rd., f., e.r. 55*l.*	590

By CHESTERTON & SONS.

Kensington.—7 and 12, Phillimore-ter., u.t. 32 yrs., g.r. 12*l.* 10s., e.r. and y.r. 130*l.*	1,265

By NEWBON, SHEPHARD, & EDWARDS.

Poplar,—1 to 4, Sophia-st., also 1. 2, and 3, Elizabeth-pl., u.t., 85 yrs., g.r. 35*l.*, w.r. 193*l.*	£350
Kentish Town.—Gaisford-st., "The Royal Arms" p.-h., a profit rental of 50*l.*, u.t. 41 yrs., with reversion	550
Hackney.—103, Lansdowne-rd., u.t. 56 yrs., g.r. 7*l.*, w.r. 54*l.*	245
Canonbury.—15, Alma-rd., u.t. 39 yrs., g.r. 15*l.*, e.r. 50*l.*	150
Clapton.—Cassimer-ter., f.g.r. 16*l.*, reversion in 60 yrs.	330

By RAWLINS & Co.

Sydenham.—Sydenham-rd., f.g.r. 16*l.*, reversion in 72 yrs.	375
Earlsfield.—Brocklebank-rd., f.g.r. 15*l.*, reversion in 81 yrs.	330
Brocklebank-rd., f.g.r. 10*l.*, reversion in 81 yrs.	220

By STIMSON & SONS.

Kilburn.—117, Canterbury-rd., u.t. 50 yrs., g.r. 7*l.* 10s., y.r. 50*l.*	400
Marylebone.—23, Saville-st. (s.). u.t., 41 yrs., g.r. 12*l.*, w.r. 105*l.*	505
Old Kent-road.—13 to 21 (odd), Leo-st., u.t. 35¼ yrs., g.r. 10*l.*, w.r. 109*l.*	560
Peckham,—5, Staveley-rd., u.t. 37 yrs., g.r. 3*l.* 12s., w.r. 26*l.*	190
4, Burchell-rd., u.t. 40¾ yrs., g.r. 4*l.*, w.r. 36*l.*	255
Sudbury.—Montrose-cres., f.g.r. 30*l.*, reversion in 73 yrs.	650
Clapham Common.—69, Stormont-rd., u.t. 86 yrs., g.r. 7*l.*, y.r. 38*l.*	420
75, Stormont-rd., u.t. 86 yrs., g.r. 7*l.*, w.r. 57*l.*	415
77, Stormont-rd., u.t. 86 yrs., g.r. 7*l.*, y.r. 38*l.*	420
79, Stormont-rd., u.t. 86 yrs., g.r. 7*l.*, w.r. 57*l.*	410
Notting Hill.—15, Ladbroke-gdns., f., e.r. 120*l.*	1,320
Maida Vale.—8, Delamere-ter., u.t. 41¾ yrs., g.r. 12*l.* 12s., e.r. 70*l.*	550

By WILLIAM WESTON.

Kilburn.—51 and 69, Princess-rd., u.t. 55 yrs., g.r. 15*l.*, y.r. 88*l.*	720
Wembley.—"Fairlawn," Union-rd., f., p.	800
St. John's Wood.—Cochrane-st., u.t. 12 yrs., g.r. 1*l.* 10s., w.r. 48*l.* 2s.	155

April 12.—By HARMAN BROS.

Peckham.—7, 9, and 11, Hooks-rd., u.t. 60 yrs., g.r. 13*l.* 10s., w.r. 80*l.* 12s.	460

By LESLIE, MARSH, & Co.

Brixton.—5, 6, and 7, Frederick-cres., u.t. 54 yrs., g.r. 16*l.* 10s., y.r. 90*l.*	740
Bayswater.—7, Hereford-rd. (s.), u.t. 45 yrs., g.r. 15*l.*, y.r. 100*l.*	1,000

By MAPLE & Co.

Dulwich.—33, East Dulwich-gr., f., y.r. 120*l.*	1,900
Anerley.—105, Anerley-rd., f., y.r. 60*l.*	1,200
Penge.—22 and 24, Beckenham-rd., f., y.r. 105*l.*	1,400

By MAY & ROWDEN.

Cavendish-Square.—6, Bentinck-st., u.t. 29¼ yrs., g.r. 30*l.*, y.r. 250*l.*	2,640

By MARTIN, WHITE, & Co.

Dulwich.—51, Oakhurst-gr., u.t. 71 yrs., g.r. 10*l.*, e.r. 40*l.*	365

By SKILTON & GOULDEN.

Wandsworth.—48 and 48A, Tonsley-hill, u.t. 80 yrs., g.r. 7*l.*, w.r. 67*l.* 12s.	430

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold, p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. beerhouse; p.h. for public-house; o. for office; s. for shops; ct. for court.

MEETINGS.

FRIDAY, APRIL 19.

Royal Sanitary Institute.—Mr. J. E. Worth on "Sewerage." 7 p.m.

SATURDAY, APRIL 20.

Royal Institution.—Professor Silvanus P. Thompson on "Studies in Magnetism.—II. 3 p.m.

Royal Sanitary Institute (Demonstrations for Sanitary Officers).—Inspection at Morden Hall Dairy Farm, Morden, Surrey. 3 p.m.

Edinburgh Architectural Association.—Visit to Bangour village.

MONDAY, APRIL 22.

Royal Institute of British Architects.—Mr. A. W. Weissman on "Picture Galleries." 8 p.m.

Royal Sanitary Institute.—Mr. J. E. Worth on "Sewage Disposal." 7 p.m.

Surveyors' Institution.—Resumed discussion on paper by Mr. L. S. Wood on "The Improvement of our Woodlands." 4 p.m.

TUESDAY, APRIL 23.

Builders' Clerks' Benevolent Institution.—The 29th Annual Dinner, King's Hall, Holborn Restaurant. 6 p.m.

Institution of Civil Engineers.—Papers to be further discussed: "The Pyrmont Bridge, Sydney, N.S.W.," by Mr. Percy Allan; and "Swing Bridge over the River Avon, at Bristol," by Mr. W. H. B. Savile. 8 p.m.

WEDNESDAY, APRIL 24.

Royal Sanitary Institute.—Mr. J. E. Worth on "Scavenging, Disposal of House Refuse," 7 p.m.; inspection at the East London Waterworks, Lea Bridge, Clapton, 3 p.m.

Edinburgh Architectural Association.—Annual Business meeting and President's Valedictory Address. 8 p.m.

THURSDAY, APRIL 25.

Institution of Mechanical Engineers.—Presidential address. 8 p.m.

Institution of Electrical Engineers.—Ordinary general meeting at the Institution of Civil Engineers, Great George-street, S.W. 8 p.m.

FRIDAY, APRIL 26.

Architectural Association.—Mr. F. W. Simon on "Liverpool Architecture." 7.30 p.m.

Quantity Surveyors' Association.—The Annual Dinner, Criterion Restaurant, 6.30 p.m.

Royal Institution.—Mr. J. Swinburne, F.R.S., on "New Illuminants." 9 p.m.

Institution of Mechanical Engineers.—Anniversary Dinner, Hotel Cecil.

SATURDAY, APRIL 27.

Royal Institution.—Professor Silvanus P. Thompson on "Studies in Magnetism."—III. 3 p.m.

Royal Sanitary Institute.—Inspection for Sanitary Officers at the Sewage Outfall Works, Barking. 3 p.m.

TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum (52 numbers) PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, etc., 26s. per annum.

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PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.	
Hard Stocks	1 8 0	per 1000 alongside, in river.
Rough Stocks and Grizzles	1 6 0	" " "
Picked Stocks for Facings	2 10 0	" delivered.
Flettons	1 8 0	" at railway depôt.
Red Wire Cuts	1 14 0	" " "
Best Fareham Red	3 12 0	" " "
Best Red Pressed Ruabon Facing	5 0 0	" " "
Best Blue Pressed Staffordshire	3 15 0	" " "
Do. Bullnose	4 0 0	" " "
Best Stourbridge Fire Bricks	3 14 0	" " "
GLAZED BRICKS.		
Best White and Ivory Glazed Stretchers	12 0 0	" " "
Headers	11 0 0	" " "
Quoins, Bullnose, and Flats	16 0 0	" " "
Double Stretchers	19 0 0	" " "
Double Headers	16 0 0	" " "
One Side and two Ends	19 0 0	" " "
Two Sides and one End	20 0 0	" " "
Splays, Chamferred, Squints	20 0 0	" " "
Best Dipped Salt Glazed Stretchers, and Header	12 0 0	" " "
Quoins, Bullnose, and Flats	14 0 0	" " "
Double Stretchers	15 0 0	" " "
Double Headers	14 0 0	" " "
One Side and two Ends	15 0 0	" " "
Two Sides and one End	15 0 0	" " "
Splays, Chamferred, Squints	14 0 0	" " "
Second Quality White and Dipped Salt Glazed	2 0 0	" less than best.

	s. d.	
Thames and Pit Sand	7 0	per yard, delivered.
Thames Ballast	5 6	" "
Best Portland Cement	28 0	per ton, "
Best Ground Blue Lias Lime	19 0	" "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 11s. 6d. per yard, delivered.
Stourbridge Fireclay in sacks 27s. 0d. per ton at rly. dpt.

STONE.

	s. d.	
BATH STONE—delivered on road waggons, Paddington Depôt	1 6½	per ft. cube.
Do. do. delivered on road waggons, Nine Elms Depôt	1 8½	" "
PORTLAND STONE (20 ft. average)—		
Brown Whitbed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 1	" "
White Basebed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 2½	" "

	s. d.	
Ancaster in blocks	1 10	per ft. cube, deld. rly. depôt.
Beer "	1 6	" "
Greenshill "	1 10	" "
Darley Dale in blocks	2 4	" "
Red Corsehill "	2 2	" "
Closeburn Red Freestone	2 0	" "
Red Mansfield "	2 4	" "
YORK STONE—*Robin Hood Quality.*		
Scappled random blocks	2 10	" "
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 3	per ft. super., "
6 in. rubbed two sides ditto, ditto	2 6	" "
3 in. sawn two sides slabs (random sizes)	0 11½	" "
2 in. to 2½ in. sawn one side slabs (random sizes)	0 7½	" "
1½ in. to 2 in. ditto, ditto	0 6	" "
HARD YORK—		
Scappled random blocks	3 0	per ft. cube, "
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 8	per ft. super. "
6 in. rubbed two sides ditto	3 0	" "

STONE (*continued*).

	£ s. d.	
HARD YORK (*continued*)—		
3 in. sawn two sides slabs (random sizes)	1 2	per ft. super. deld. rly. depôt.
2 in. set-faced random flags	0 5	" "

SLATES.

	£ s. d.	
In. In.		
20×10 best blue Bangor	13 2 6	per 1000 of 1200 at r. d.
20×12 " "	13 17 6	" "
20×10 first quality "	13 0 0	" "
20×12 " "	13 15 0	" "
16×8 " "	7 5 0	" "
20×10 best blue Portmadoc	12 12 6	" "
16×8 " "	6 12 6	" "
20×10 best Eureka unfading green	15 17 6	" "
20×12 " "	18 7 6	" "
18×10 " "	13 5 0	" "
16×8 " "	10 5 0	" "
20×10 permanent green	11 12 6	" "
18×10 " "	9 12 6	" "
16×8 " "	6 12 6	" "

TILES.

	s. d.	
Best plain red roofing tiles	42	0 per 1000 at rly. depôt.
Hip and Valley tiles	3	7 per doz. "
Best Broseley tiles	50	0 per 1000 "
Do. Ornamental tiles	52	6 " "
Hip and Valley tiles	4	0 per doz. "
Best Ruabon red, brown, or brindled do. (Edwards)	57	6 " "
Do. Ornamental do.	60	0 " "
Hip tiles	4	0 per doz. "
Valley tiles	3	0 " "
Best Red or Mottled Staffordshire do. (Peakes)	51	9 per 1000 "
Do. Ornamental do.	54	6 " "
Hip tiles	4	1 per doz. "
Valley tiles	3	8 " "
Best "Rosemary" brand plain tiles	48	0 per 1000 "
Best Ornamental tiles	50	0 " "
Hip tiles	4	0 per doz. "
Valley tiles	3	8 " "
Best "Hartshill" brand plain tiles, sand-faced	50	0 per 1000 "
Do. pressed	47	6 " "
Do. Ornamental do.	50	0 " "
Hip tiles	4	0 per doz. "
Valley tiles	3	6 " "

WOOD.

BUILDING WOOD.	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	13 10 0	... 15 0 0
Deals: best 3 by 9	13 0 0	... 14 0 0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11 0 0	... 12 0 0
Battens: best 2½ by 6 and 3 by 6	0 10 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less thn best.
Battens: seconds	0 10 0	" "
2 in. by 4 in. and 2 in. by 6 in.	9 0 0	... 10 0 0
2 in. by 4½ in. and 2 in. by 5 in.	8 10 0	... 9 10 0
Foreign Sawn Boards—		
1 in. and 1½ in. by 7 in.	0 10 0	more than battens.
¾ in.	1 0 0	"

	At per load of 50 ft.	
Fir timber: best middling Danzig or Memel (average specification)	4 10 0	... 5 0 0
Seconds	4 0 0	... 4 10 0
Small timber (8 in. to 10 in.)	3 12 6	... 3 15 0
Small timber (6 in. to 8 in.)	3 0 0	... 3 10 0
Swedish balks	2 10 0	... 3 0 0
Pitch-pine timber (30 ft. average)	4 0 0	... 4 15 0

JOINERS' WOOD.	At per standard. £ s. d.	£ s. d.
White Sea: first yellow deals, 3 in. by 11 in.	24 0 0	... 25 0 0
3 in. by 9 in.	22 0 0	... 23 0 0
Battens, 2½ in. and 3 in. by 7 in.	16 10 0	... 18 0 0
Second yellow deals, 3 in. by 1 in.	18 10 0	... 20 0 0
" " 3 in. by 9 in.	17 10 0	... 19 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	... 14 10 0
Third yellow deals, 3 in. by 11 in. and 9 in.	13 10 0	... 15 0 0
Battens, 2½ in. and 3 in. by 7 in.	11 0 0	... 12 0 0
Petersburg first yellow deals, 3 in. by 11 in.	21 0 0	... 22 10 0
Do. 3 in. by 9 in.	18 0 0	... 19 10 0
Battens	13 10 0	... 15 0 0
Second yellow deals, 3 in. by 11 in.	16 0 0	... 17 0 0
Do. 3 in. by 9 in.	14 10 0	... 16 0 0
Battens	11 0 0	... 12 10 0
Third yellow deals, 3 in. by 11 in.	13 0 0	... 14 0 0
Do. 3 in. by 9 in.	12 10 0	... 14 0 0
Battens	10 0 0	... 11 0 0
White Sea and Petersburg—		
First white deals, 3 in. by 11 in.	14 10 0	... 15 10 0
" " 3 in. by 9 in.	13 10 0	... 14 10 0
Battens	11 0 0	... 12 0 0
Second white deals, 3 in. by 11 in.	13 10 0	... 14 10 0
" " 3 in. by 9 in.	12 10 0	... 13 10 0
" " battens	10 0 0	... 11 0 0
Pitch-pine: deals	18 0 0	... 21 0 0
Under 2 in. thick extra	0 10 0	... 1 0 0
Yellow Pine—First, regular sizes	44 0 0	upwards.
Oddments	32 0 0	"
Seconds, regular sizes	33 0 0	"
Yellow Pine oddments	28 0 0	"
Kauri Pine—Planks, per ft. cube	0 3 6	... 0 5 0
Danzig and Stettin Oak Logs—		
Large, per ft. cube	0 3 0	... 0 3 6
Small " "	0 2 6	... 0 2 9
Wainscot Oak Logs, per ft. cube	0 5 6	... 0 6 0
Dry Wainscot Oak, per ft. sup. as inch	0 0 8½	... 0 0 9½
¾ in. do. do	0 0 7	... —
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch	0 0 9	... 0 1 0
Selected, Figury, per ft. super. as inch	0 1 6	... 0 2 6
Dry Walnut, American, per ft. super. as inch	0 0 10	... 0 1 0
Teak, per load	17 0 0	... 22 0 0
American Whitewood Planks, per ft. cube	0 4 0	... 0 5 0

WOOD (*continued*).

JOINERS' WOOD—(*continued*).

	Per square. £ s. d.		£ s. d.
Prepared Flooring, etc.—			
1 in. by 7 in. yellow, planed and shot	0 13 6	...	0 17 6
1 in. by 7 in. yellow, planed and matched	0 14 0	...	0 18 0
1½ in. by 7 in. yellow, planed and matched	0 16 0	...	1 0 0
1 in. by 7 in. white, planed and shot	0 12 0	...	0 14 6
1 in. by 7 in. white, planed and matched	0 12 6	...	0 15 0
1½ in. by 7 in. white, planed and matched	0 15 0	...	0 16 6
¾ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0 11 0	...	0 13 6
1 in. by 7 in. „ „	0 14 0	...	0 18 0
¾ in. by 7 in. white „ „	0 10 0	...	0 11 6
1 in. by 7 in. „ „ „	0 12 9	...	0 15 0

6 in. at 6d. to 9d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £ s. d.		£ s. d.
Rolled Steel Joists, ordinary sections	7 7 6	...	7 15 0
Compound Girders, ordinary sections	9 10 0	...	10 10 0
Steel Compound Stanchions	12 5 0	...	13 5 0
Angles, Tees, and Channels, ordinary sections	9 5 0	...	10 5 0
Flitch Plates	9 5 0	...	10 5 0
Cast Iron Columns and Stanchions including ordinary patterns	8 0 0	...	9 0 0

METALS.

	Per ton, in London. £ s. d.		£ s. d.
IRON—			
Common Bars	8 10 0	...	9 0 0
Staffordshire Crown Bars, good merchant quality	9 5 0	...	9 15 0
Staffordshire "Marked Bars"	11 0 0	...	—
Mild Steel Bars	9 10 0	...	9 15 0
Hoop Iron, basis price	9 15 0	...	10 0 0
„ „ Galvanised	17 10 0	...	—

(*And upwards, according to size and gauge.)

Sheet Iron Black—			
Ordinary sizes to 20 g.	10 0 0	...	—
„ „ 24 g.	11 0 0	...	—
„ „ 26 g.	12 10 0	...	—
Sheet Iron, Galvanised, flat, ordinary quality—			
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	16 0 0	...	—
Ordinary sizes to 22 g. and 24 g.	16 10 0	...	—
„ „ 26 g.	17 0 0	...	—
Sheet Iron, Galvanised, flat, best quality—			
Ordinary sizes to 20 g.	19 0 0	...	—
„ „ 22 g. and 24 g.	19 10 0	...	—
„ „ 26 g.	21 0 0	...	—
Galvanised Corrugated Sheets—			
Ordinary sizes 6 ft. to 8 ft. 20 g.	16 0 0	...	—
„ „ 22 g. and 24 g.	16 5 0	...	—
„ „ 26 g.	17 10 0	...	—
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	13 0 0	...	—
Best Soft Steel Sheets, 22 g. & 24 g.	14 0 0	...	—
„ „ „ 26 g.	16 0 0	...	—
Cut Nails, 3 in. to 6 in.	10 15 0	...	11 5 0

(Under 3 in., usual trade extras.)

LEAD, &c.

	Per ton, in London. £ s. d.		£ s. d.
LEAD—Sheet, English, 3lb. and up.	22 17 6	...	—
Pipe in coils	23 7 6	...	—
Soil pipe	25 7 6	...	—
Compo pipe	26 7 6	...	—
ZINC—Sheet—			
Vieille Montagne ...ton	34 5 0	...	—
Silesian	34 0 0	...	—
COPPER—			
Strong Sheet ...per lb.	0 1 4	...	—
Thin „ „	0 1 5	...	—
Copper nails „	0 1 3	...	—
BRASS—			
Strong Sheet „	0 1 2	...	—
Thin „ „	0 1 3	...	—
TIN—English Ingots „	0 1 11	...	—
SOLDER—Plumbers' „	0 0 9	...	—
Tinmen's „	0 0 11	...	—
Blowpipe „	0 1 1	...	—

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.

15 oz. thirds	2½d. per ft. delivered.
„ fourths	1¾d. „ „
21 oz. thirds	3¼d. „ „
„ fourths	2½d. „ „
26 oz. thirds	4d. „ „
„ fourths	3¼d. „ „
32 oz. thirds	5d. „ „
„ fourths	4¼d. „ „
Fluted Sheet, 15 oz.	3¼d. „ „
„ 21 oz.	4¼d. „ „

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

¼ Hartley's	2¾d. per ft. delivered.
⅜ „	3¾d. „ „
½ „	3d. „ „
Figured and Oxford Rolled "Oceanic" Glass, white ...	4d. „ „
Do. „ tinted ...	5¼d. „ „

OILS, &c.

		£ s. d.
Raw Linseed Oil in pipes	per gallon	0 1 11
„ „ „ in barrels	„	0 2 0
„ „ „ in drums	„	0 2 2
Boiled „ „ in pipes	„	0 2 1
„ „ „ in barrels	„	0 2 2
„ „ „ in drums	„	0 2 4
Turpentine in barrels	„	0 4 4
„ in drums	„	0 4 7
Genuine Ground English White Lead	per ton	26 0 0
Red Lead, Dry	„	24 10 0
Best Linseed Oil Putty	per cwt.	0 7 0
Stockholm Tar	per barrel	1 12 0

VARNISHES, &c.

	Per gallon. £ s. d.
Fine Pale Oak Varnish	0 8 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak	0 10 0

VARNISHES, &c. (*continued*).

	Per gallon. £ s. d.
Superfine Hard-drying Oak, for seats of Churches	0 14 0
Fine Elastic Carriage	0 12 6
Superfine Pale Elastic Carriage	0 16 0
Fine Pale Maple	0 16 0
Finest Pale Durable Copal	0 18 0
Extra Pale French Oil	1 1 0
Eggshell Flatting Varnish	0 18 0
White Copal Enamel	1 4 0
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 8 6
Berlin Black	0 16 0
Knotting	0 10 0
French and Brush Polish	0 10 0

TO CORRESPONDENTS.

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We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender whether for publication or not. No notice can be taken of anonymous communications.

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Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance. The Editor cannot undertake to read and consider articles offered for acceptance unless they are type-written.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.* [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

ABERDEEN.—For reconstruction of Bayview tramway route, for the Corporation. Mr. W. Dyack, Burgh Surveyor, Aberdeen:—
J. McAdam & Sons, Charlotte-street, Aberdeen*.. £3,795

ABERTRIDWR.—For paving, etc., of Tridwr-road, for Caerphilly Urban District Council. Mr. A. O. Harpur, Surveyor, Council Offices, Caerphilly:—

Hatherey & Co.	£453 4 7	G. Rutter	£379 10 11
Evans & Murray	414 1 1	J. Williams	
A. G. Collins	394 15 8	Abertridwr*	376 6 11

[Surveyor's estimate, £400.]

ALDERSHOT.—For new service reservoir, for Aldershot Gas and Water Co.:—

	Concrete Roof.		Corrugated Roof.
Grounds & Newton	£6,813 10 0	....	£7,028 3 3
E. Potterton & Co.	6,470 8 3	....	6,873 3 6
W. Moss & Sons, Ltd.	6,372 8 6	....	6,527 12 10
S. Redhouse, sen.	5,875 12 2	....	5,191 10 0
Ripley, Strong, & Co.	5,748 4 9	....	6,085 9 3
S. Kavanagh & Co.	5,681 4 4	....	5,906 4 6
W. Underwood & Bro.	5,648 0 6	....	5,937 2 4
Martin, Wells, & Co.	5,530 0 0	....	6,050 0 0
T. Vale & Sons	5,499 14 8	....	5,694 4 9
B. Cooke & Co.	5,471 0 0	....	6,071 0 0
F. W. Trimm	5,363 0 0	....	5,664 0 0
R. H. B. Neale, Ltd.	5,128 11 8	....	5,302 12 0
G. Hay & Co.	5,105 16 10	....	5,451 4 10
A. E. Nunn	5,024 8 6	....	5,442 12 0
J. Moran & Son	5,000 0 0	....	5,500 0 0
Pedrette & Co.	4,983 4 9	....	5,588 18 0
G. E. Wallis & Son	4,868 0 0	....	5,273 0 0
T. H. Macdonald	4,800 0 0	....	5,138 0 0
A. G. Osenton	4,786 0 0	....	5,183 0 0
G. Bell & Son	4,415 0 0	....	5,001 0 0
G. Kemp	4,279 0 0	....	4,889 0 0

ASHBOURNE.—For erecting a new grammar school, for the Governor's of Queen Elizabeth's Grammar School. Mr. E. M. Longsdon, architect, Bakewell. Quantities by the architect:—

Bowman & Sons	£12,400	R. Kershaw	£10,200
P. Birch & Sons	12,198	G. Hodges	9,895
J. W. Wildgoose	10,684	T. Cuthbert	9,750
T. Fish & Sons	10,643	T. Lowe & Sons	9,090
J. Heath & Sons	10,601	W. Thorley, Ashbourne†	9,000
Cox, Wilson, & Sons	10,500	H. W. Parker & Sons	8,981
J. & J. Warner	10,450		
W. Smith & Sons	10,450		

BALLYBAY (Co. Monaghan).—For additions and improvements to St. Patrick's Church, Lough Bawn, for Very Rev. Dr. McGlone, P.P. Mr. William A. Scott architect, 45, Mountjoy-square, Dublin:—

F. Duffy	£844
Coulson & Gray, Hatton, Ballybay*	805

BEDLINOG (Glamorgan).—For building a new infants' school at Bedlinog, for the Glamorgan Education Committee. Mr. D. Pugh-Jones, F.S.I., County Architect, Cardiff:—
D. W. Davies, Morgan-arcade, Cardiff*.. £2,886

BEVERLEY.—For painting work at the asylum, for East Riding Lunatic Asylum Visiting Committee. Mr. J. Bilson, architect, 23, Parliament-street, Hull:—
J. Porter, Holderness-road, Hull* £485 15

BIDEFORD.—For laying on water, Devon County Show, for the Corporation. Mr. R. E. L. Hookway, Borough Surveyor, Bideford:—

H. I. Meredith, High-street, Bideford*	£118 0 0
J. Priscott	110 17 6

BRIGHTON.—For the erection of a detached house in Dyke-road, Brighton, for Mr. W. F. Knight. Messrs. Overton & Scott, architects and surveyors, Brighton, and Public Hall, Uckfield:—

Packham, Sons, & Palmer	£1,405	Simmonds Bros.	£1,198
W. Brown & Sons	1,390	G. P. Kerridge	1,175
H. J. Penfold	1,347	A. Chilton	1,139
A. E. Lewer	1,200	A. Cruttenden, Brighton*	1,025

BRIGHTON.—For the new buildings for the Junior House School, for the Roedean (Junior House) School Site and Buildings, Ltd. Messrs. J. W. Simpson & M. Ayrton, architects, Gray's Inn, W.C. Quantities by Messrs. G. M. Simpson & N. Evill:—

H. J. Penfold	£18,960	W. H. Lorden & Son‡	£16,789
G. H. Denne & Son	18,867	Patman & Fotheringham, Ltd.	16,563
Potters Bros.	18,130	W. S. Shepherd & Co.	16,464
Longley, James, & Co.	17,448	H. Flint	16,147
Holt, Walker, & Sons	17,200	W. F. Blay	16,000
J. Parnell & Son	17,162	Stevens, Bastow, & Co., Ltd.	15,996
W. Johnson & Co., Ltd.	16,990	R. Cook & Sons	15,985
J. Barnes & Sons	16,976	F. G. Minter	15,977
E. Lawrance & Sons	16,885		

‡ Tender irregular.

CAERPHILLY.—For road works, Castle-street and Cardiff-road (part of), for the Urban District Council. Mr. A. O. Harpur, Surveyor, Council Offices, Caerphilly:—

J. E. Evans	£791 18 0	Hatherley & Co.	£703 10 0
T. F. Howells	727 5 8	A. J. Rossiter, Caerphilly*	700 12 1
G. Rutter	706 5 2		
A. G. Collins & Co.	704 2 7		

[Surveyor's estimate, £750.]

CHESTERFIELD.—For alterations to the shops on the south side of the covered market, for the Corporation. Mr. N. Smith, Borough Surveyor. Quantities by Borough Surveyor:—

J. Collis & Sons	£1,685	G. F. Kirk*	£1,432
J. Wright	1,590		

[All of Chesterfield.]

GUSSAGE ST. MICHAEL.—For rebuilding Wesleyan Church, for Trustees. Mr. W. T. Chinchen, architect, Crichel, Wimborne:—

F. J. White	£700 18 4	Hayward & Sons	£545 10 0
H. Cobb	616 0 0	J. Smith, Wimborne*	520 0 0

KINSALE.—For erecting ten houses at the World's End, including the building of a retaining wall 50 ft. in length, for the Urban District Council, under the Housing of the Working Classes Act. Mr. J. W. Dorman, C.E., Fisher-street, Kinsale:—
Kelly & Sons, Kinsale £1,400

LLANALLGO.—For erecting new Council school, for Anglesey Education Committee. Mr. J. Owen, F.R.I.B.A., County Architect, Menai Bridge, and Holyhead:—
O. Thomas, Amlwch* £1,159

LLANTWIT VARDRE (Pontypridd).—For additions and alterations to the Council school. Mr. D. Pugh-Jones, F.S.I., County Architect, Cardiff:—
Mr. J. E. Evans, Pontypridd*..... £1,809

LONDON.—(a) For enclosing with iron railing (about 759 ft.), utilising as much of the existing railing as possible, the western boundary of land purchased for enlarging Greenwich cemetery. (b) For enclosing the north and south boundaries with 6 ft. 6 in. oak park pale fence (about 751 ft.). (c) For enclosing the western boundary with 6 ft. 6 in. oak park pale fence; for Greenwich Borough Council. Mr. A. Roberts, F.R.I.B.A., 92, London-street, Greenwich:—
H. Groves, Stockwell-street, Greenwich* .... (b) £178 (c) 179

LONDON.—For the erection of stabling, etc., Kensington, for Messrs. Slaters, Ltd. Mr. Richard J. Lovell, architect, 46, Queen Victoria-street, E.C.:—

Perry & Co.	£2,705	Minter & Co.	£2,595
Roffey & Co.	2,649	Roome & Co.	2,365
Wisdom Bros.	2,607	Spencer, Santo, & Co., Kensington*	2,286

MILFORD HAVEN.—For cookery and laundry rooms, at the county school. Messrs. D. E. Thomas & Sons, architects, Victoria-place, Haverfordwest:—

S. A. Scott	£789	Lloyd & Co.	£702
H. Adams	740	Cole & Sons*	679

[All of Milford Haven. Architects' estimate, £700.]

NARBOROUGH and COSBY.—For sewerage works, for the Blaby Rural District Council. Mr. J. Turner, engineer and surveyor, Blaby-road, South Wigston:—

R. Moss & Sons	£5,250	Keetch & Wainer	£4,640
G. Henson & Son	5,155	E. Orton	4,550
A. Palmer	5,094	T. Holme & Son	4,510
S. Manton	4,969	W. J. Wilmott	4,468
T. Smart	4,897	O. Wright & Co.	4,437
Johnson & Langley	4,813	T. H. Harper	4,407
T. Hickman	4,719	H. H. Barry, Radcliffe-on-Trent*	4,211
J. H. Macdonald	4,700		
Ward & Tetley	4,679		

PAIGNTON.—For extending a sewer, laying a water-main, and making-up the roadway, etc., in Preston Down-road for the Urban District Council. Mr. C. Owen Baines, surveyor, Town Hall, Paignton:—
M. Bridgman, Paignton £733 10 7

PENTYRCH (near Cardiff).—For building a new Council school at Pentyrch, for the Glamorgan Education Committee. Mr. D. Pugh-Jones, F.S.I., County Architect, Cardiff:—
Knox & Wells, Bangor-street, Cardiff* .. £4,375

PONTEFRACT.—For erecting drill-hall, etc., for Major C. C. Moxon. Messrs. Garside & Pennington, architects and surveyors, Pontefract and Castleford:—

Brickwork: H. Gundill*	£308	13 6
Woodwork: D. Jackson*	230	0 0
Painters: H. Butler & Sons*	11	0 0
Slaters: Stewart Bros.*	84	0 0
Plasterer: T. W. Senior*	52	10 0
Plumber: W. Pearson*	88	4 4

[All in Pontefract.]

PONTEFRACT.—For the erection of schools, etc., for the Vicar of All Saints. Messrs. Garside & Pennington, architects and surveyors, Pontefract and Castleford:—

Brickwork; H. Gundill*	£782	6 0
Woodwork; Barker & Jowitt*	293	14 0
Plasterer; T. W. Senior*	15	0 0
Plumber; T. Leng*	111	17 0
Slaters: Stewart Bros.*	68	3 4
Painter: S. Harrison*	24	0 0

[All of Pontefract.]

PONTEFRACT.—For erecting an operating theatre and anæsthetic room at the General Dispensary, for the Misses Robson. Messrs. Garside & Pennington, architects and surveyors, Pontefract and Castleford:—

Brickwork: H. Gundill*	£340	8 3
Woodwork: D. Jackson*	36	18 2
Plaster: T. W. Senior*	9	8 0
Plumber: W. H. Keighley*	34	5 0
Painter: S. Harrison*	5	13 0

[All of Pontefract.]

RHOSCOLYN.—For erecting out-offices at Council school for Anglesey Education Committee. Mr. J. Owen, F.R.I.B.A., County Architect, Menai Bridge:—

H. & J. Williams, Llanrhyddlad* £98 18 6

ROCHFORD (Essex).—For erecting new receiving and mental wards at the Workhouse, for the Board of Guardians. Messrs. Greenhalgh & Brockbank, architects, Bank-chambers, Southend-on-Sea. Quantities by Mr. G. T. G. Wright, 3, Great Winchester-street, E.C.:—

—	Receiving Ward.	Mental Ward.	Total.
	£ s. d.	£ s. d.	£ s. d.
Smith & Son	1,895 0 0	1,190 0 0	3,085 0 0
J. C. Flaxman....	1,893 0 0	1,055 0 0	2,948 0 0
S. Norden	1,805 0 0	1,050 0 0	2,855 0 0
Elvy & Son	1,761 0 0	1,020 0 0	2,781 0 0
Hammond & Son..	1,745 0 0	1,000 0 0	2,745 0 0
Moss & Co.	1,700 0 0	1,020 0 0	2,720 0 0
W. G. Leaney....	1,715 0 0	965 0 0	2,680 0 0
F. E. Woodhams..	1,643 0 0	1,040 0 0	2,683 0 0
Whur & Campkin.	1,650 0 0	1,000 0 0	2,650 0 0
F. Davey.....	1,622 0 0	967 0 0	2,589 0 0
G. Burrill.....	1,655 0 0	900 0 0	2,555 0 0
A. R. Whur.....	1,597 0 0	920 0 0	2,517 0 0
Westgate & Co. ..	1,579 0 0	929 0 0	2,508 0 0
W. E. Davey	1,542 9 6	935 16 10	2,478 6 4
F. & E. Davey, Ltd.*	1,567 0 0	897 0 0	2,464 0 0

ROTHIENORMAN.—Accepted for the mason, carpenter, slater, plaster, plumber, and painter works of lodge at Rothie House, Rothienorman. Messrs. Duncan & Son, architects, Turriff, Scotland:—

Masons: Florence & Summers, Wartle
Carpenters: A. & W. Hendry, Wartle.
Slater: J. P. Pirie, Fyvie..... £340 4
Plasterer: J. B. Dallas, Turriff .....
Plumbers: J. Laing & Sons, Inverurie.
Painter: D. Davidson, Turriff .....

SOUTHEND-ON-SEA.—For making-up of the continuation of Royal-mews, for the Corporation. Mr. E. J. Elford, Borough Surveyor, Southend-on-Sea:—

W. Iles	£72 0 0
Buxton & Jenner, Southend*	67 6 1

TON PENTRE.—For alterations and additions to vestry of Jerusalem Welsh Calvinistic Methodist Chapel, for the trustees of Jerusalem Calvinistic Methodists, Ton Pentre. Mr. W. D. Morgan, architect, Post-office-chambers, Pentre:—

W. E. Willis ..	£1,500 0 0	Hughes & Sterling	£1,084 9 4
A. Richards ..	1,440 0 0	W. Lewis	990 0 0
Morgan Bros., Ton Pentre, Ystrad*	1,135 0 0		

SUNBURY (Middlesex).—Accepted for the erection of new metaxin works at Sunbury Common, for Messrs. The Wall Paper Manufacturers, Ltd., Lincrusta Walton Branch. Mr. H. Reginald Coales, A.R.I.B.A., architect, Leatherhead and Sunbury:—

G. Darlington, Amersham £2,350

TRURO.—For paving the carriage-way of St. Mary's-street with creosoted deal blocks, for the City Council. Mr. Measham Lea, City Surveyor, Truro:—

	Per super. yd. s. d.
Improved Wood Pavement Co., Ltd.	10 1
W. C. Shaddock	9 11
W. C. Shaddock	9 5
W. C. Shaddock	9 3
W. E. Blake.....	9 3
Acme Flooring & Paving Co., Ltd. (1904), London*	8 5

TWICKENHAM.—For private street improvement works, for the Urban District Council. Mr. F. W. Pearce, Surveyor to Council, Town Hall, Twickenham.—

Shepherd & Sons, Teddington*..	Lebanon-road.	£1,341
	Radnor-road..	285
T. Chapman, Hounslow*	Laurel-avenue...	765
	Bridge-road.	443
	Canac-road.	472

UCKFIELD.—For alterations and additions to the public hall, for the Public Hall Co., Ltd. Messrs. Overton & Scott, architects and surveyors, Public Hall, Uckfield, and 22, Ship-street, Brighton:—

W. Brown & Sons	£765 0	C. Pelham	£706 10
Saunders Bros. ..	755 0	H.J.Smith & Sons, Maidstone*	612 0
B. Farrant	739 0		
A. Chilton	719 0		

WALTHAMSTOW.—For heating apparatus Edinburgh-road schools, for the Education Committee. Mr. H. Prosser, Architect to the Committee:—

Price, Lea, & Co.	£314 0	J. Boyd & Sons ..	£246 0
Dargue-Griffiths & Co.	288 10	Palowkar & Son..	242 0
W. Cassidy	272 0	J. Grundy	235 10
Musgrave & Co. ..	263 10	Russell & Co.	212 10
Wortner - Smith, Gray, & Co....	259 15	E. E. Logsdon....	195 0

WINDERMERE.—For widening the main road to Patterdale, near Thickholme, for the Urban District Council. Mr. C. E. Hines, Surveyor, Council Offices, Windermere:—

T. & M. Atkinson....	£225	G. Wilson, Ambleside*	£145
R. Woodburn	190		

YOUGHAL.—For erecting a dining-hall, etc., at the Auxiliary Asylum, for the Committee of Management. Messrs. W. H. Hill & Son, architects, 28, South Mall, Cork:—

Mu[illegible]y & Sons, Youghal* £2,138

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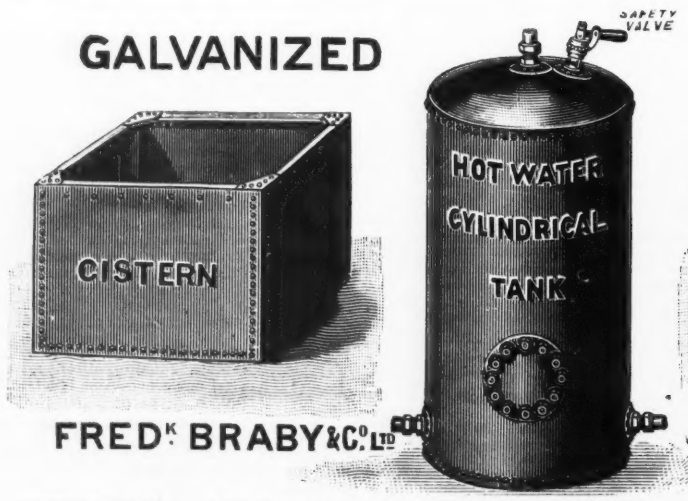

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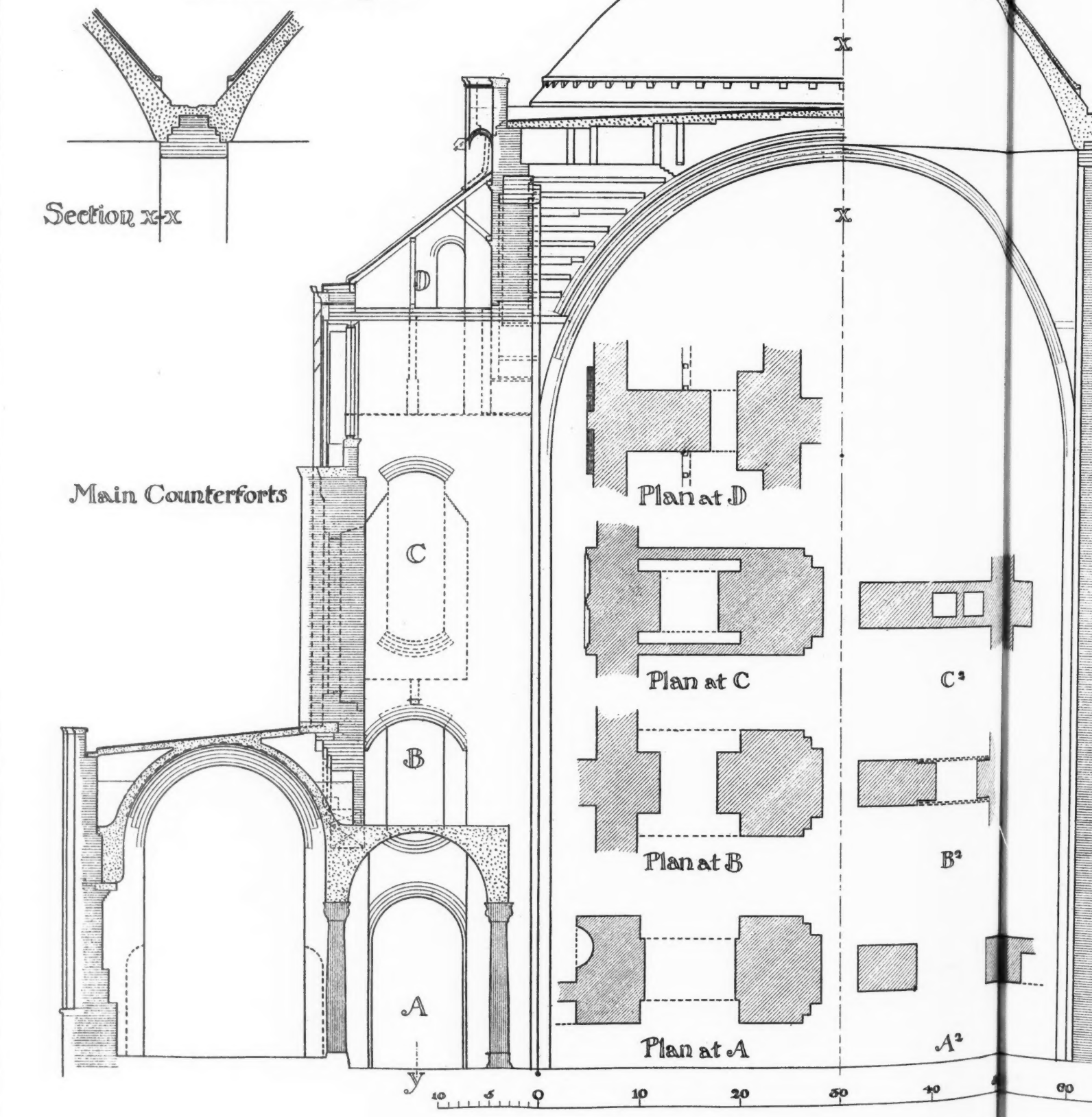
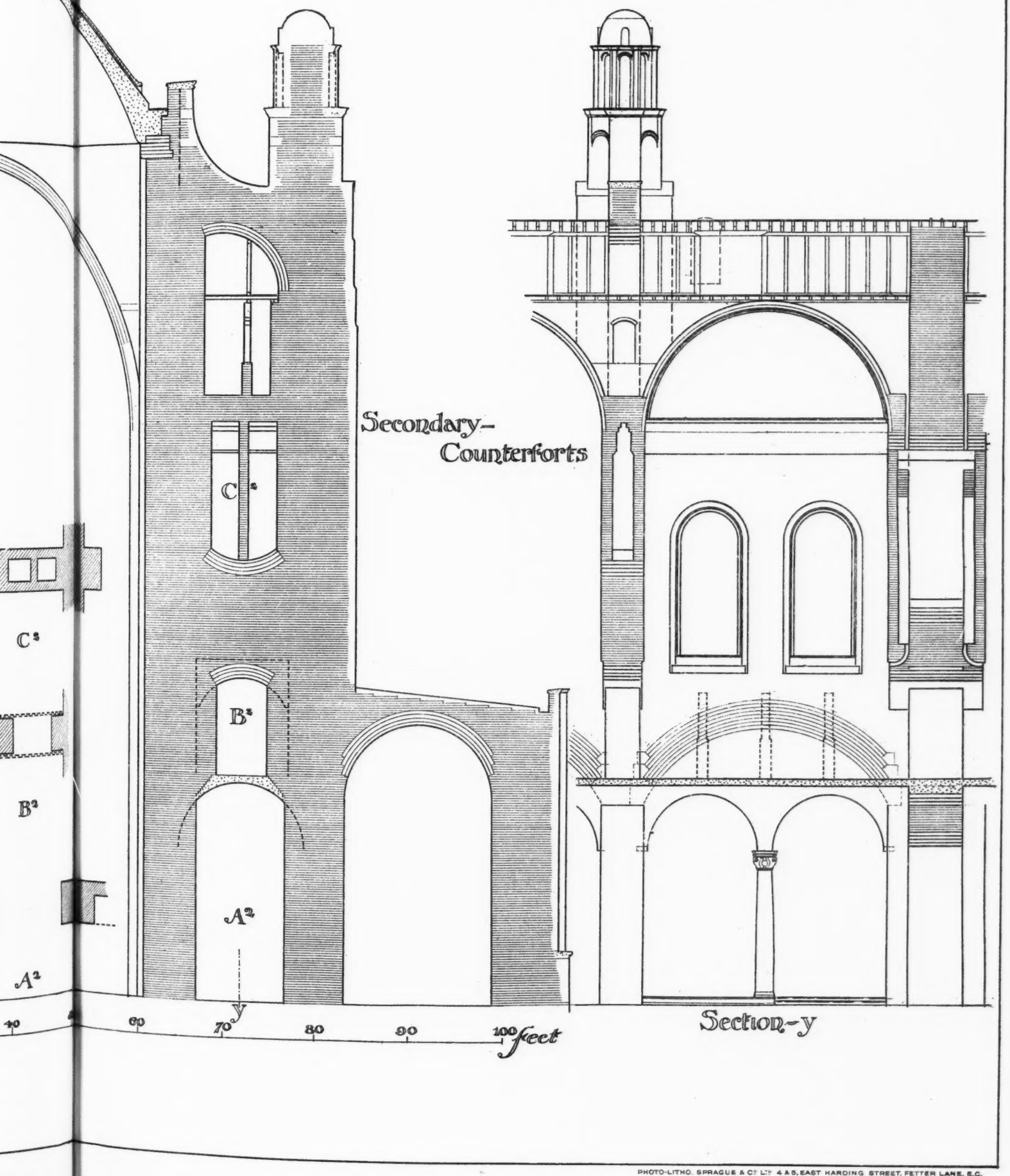
INTERIOR VIEW OF WESTMINSTER CATHEDRAL.—The late Mr. J. F. Bentley, Architect.

FROM A PHOTOGRAPH TAKEN SPECIALLY FOR THE *BUILDER*.

WESTMINSTER CATHEDRAL



Nave Vaulting & Counterforts



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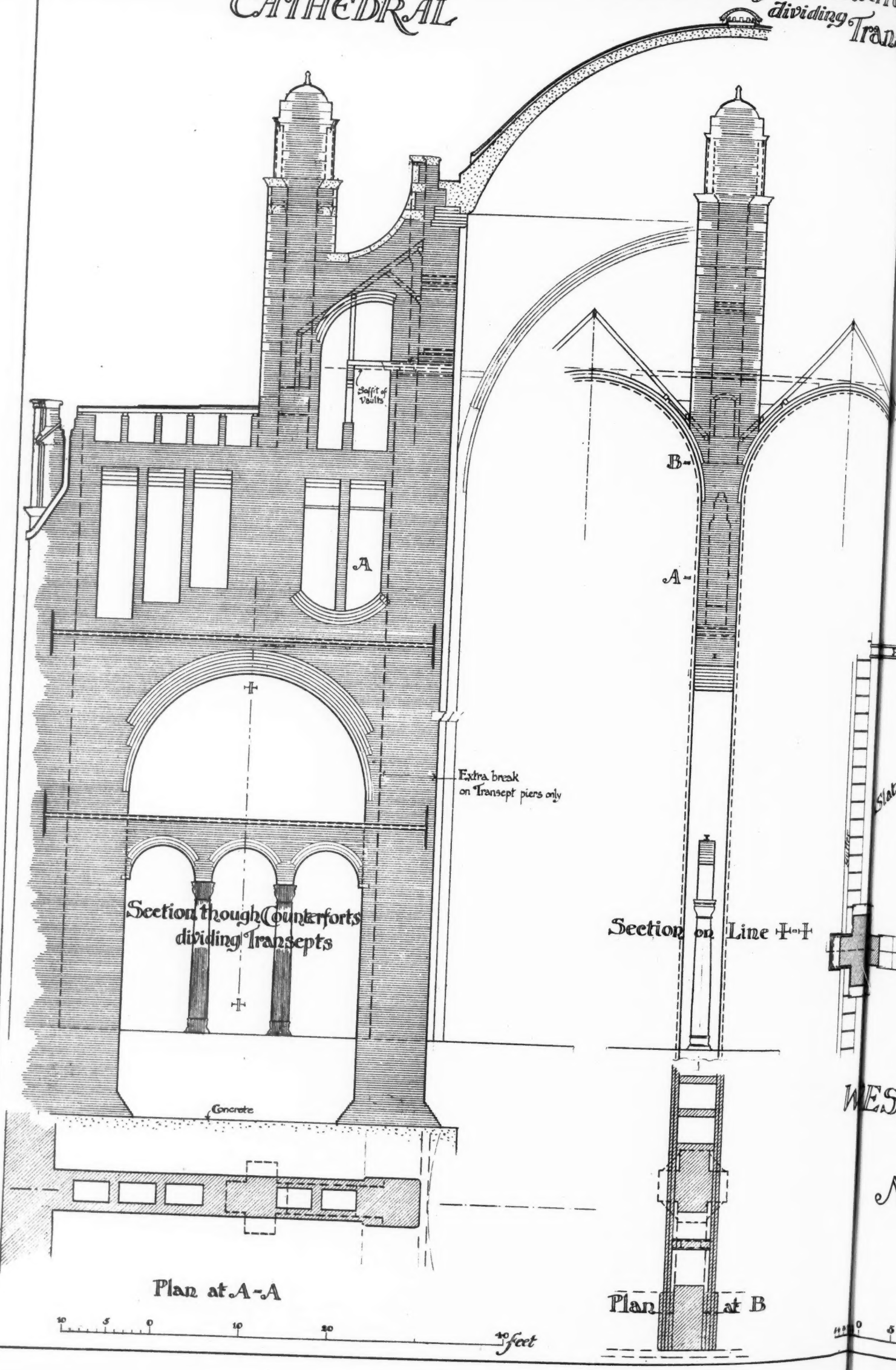
TRUCTURAL DETAILS.—The late Mr. J. F. Bentley, Architect.

WESTMINSTER CATHEDRAL

Secondary Counterforts dividing Transepts



WESTMINSTER CATHEDRAL; STRUCTURAL DETAILS.—THE LA

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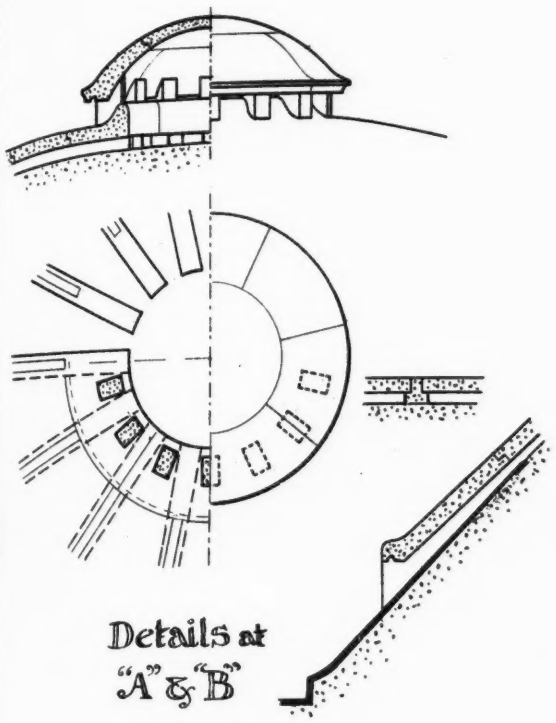

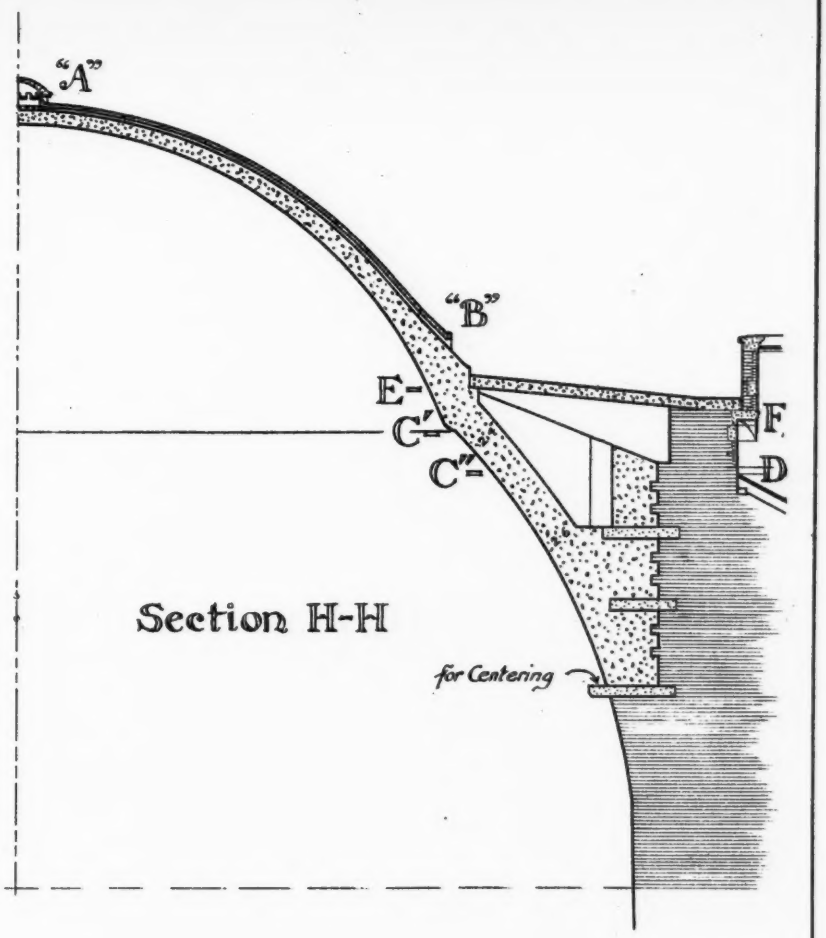

Scale
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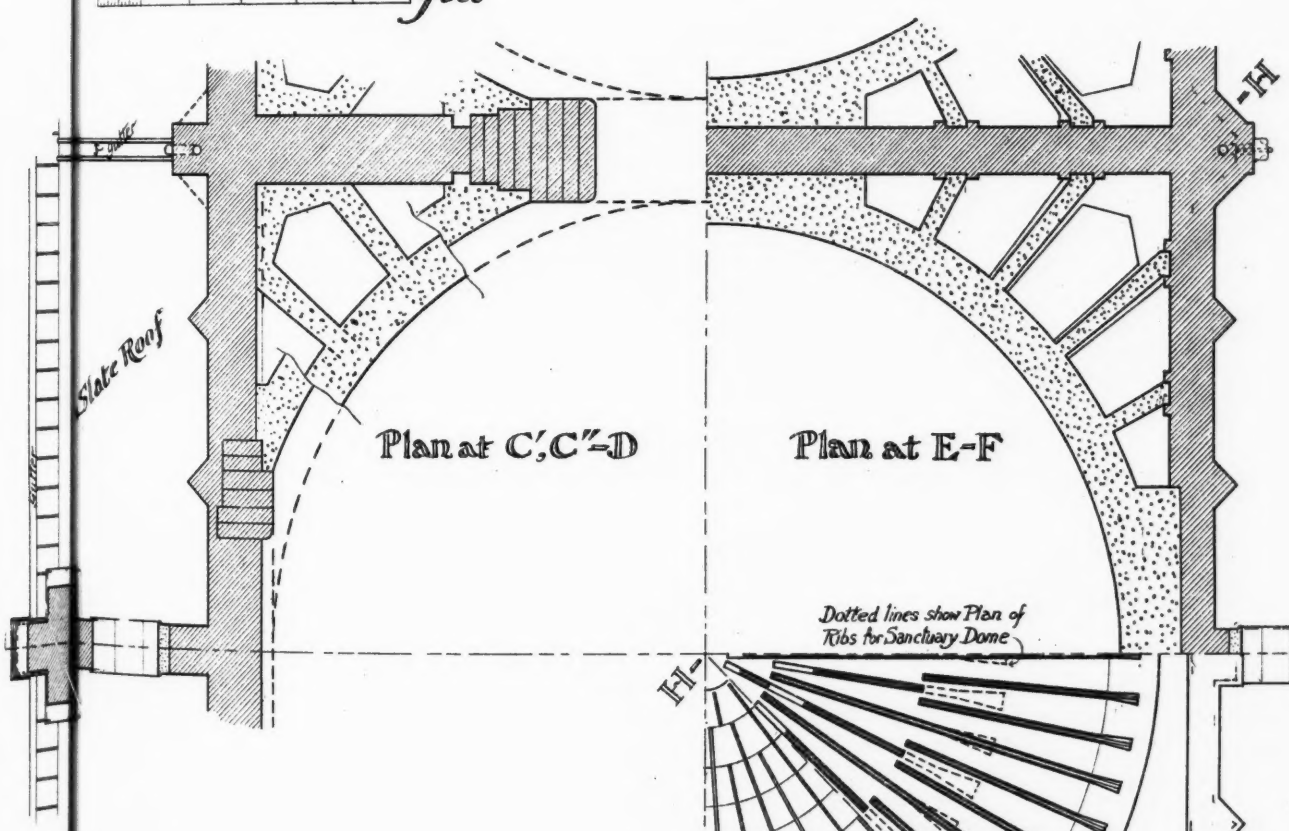

WESTMINSTER CATHEDRAL
Nave Vaulting

Scale
0 5 10 20 30 40 feet

¼ Plan
showing Arrangement of Ribs & Slabs covering the Domes

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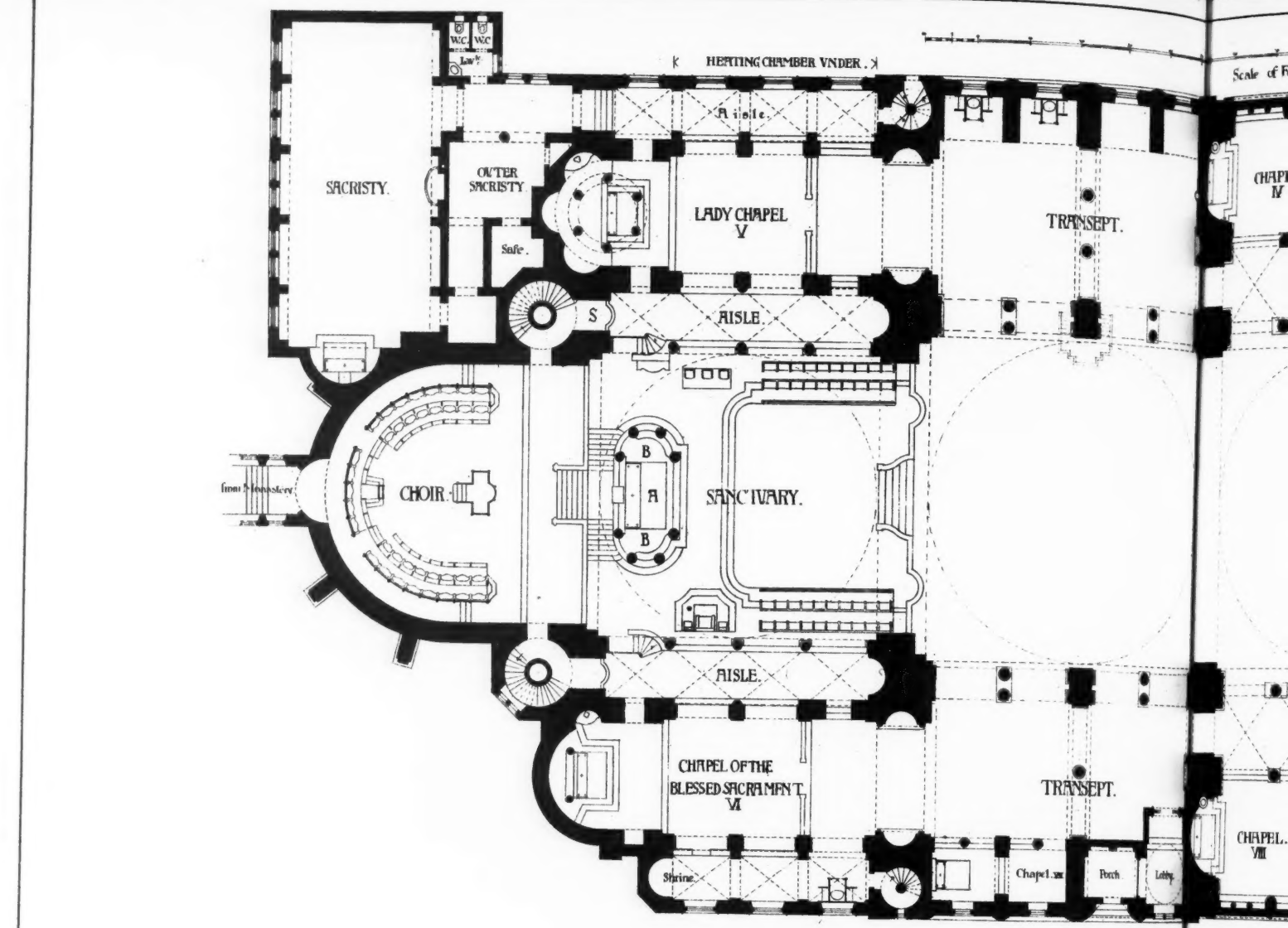
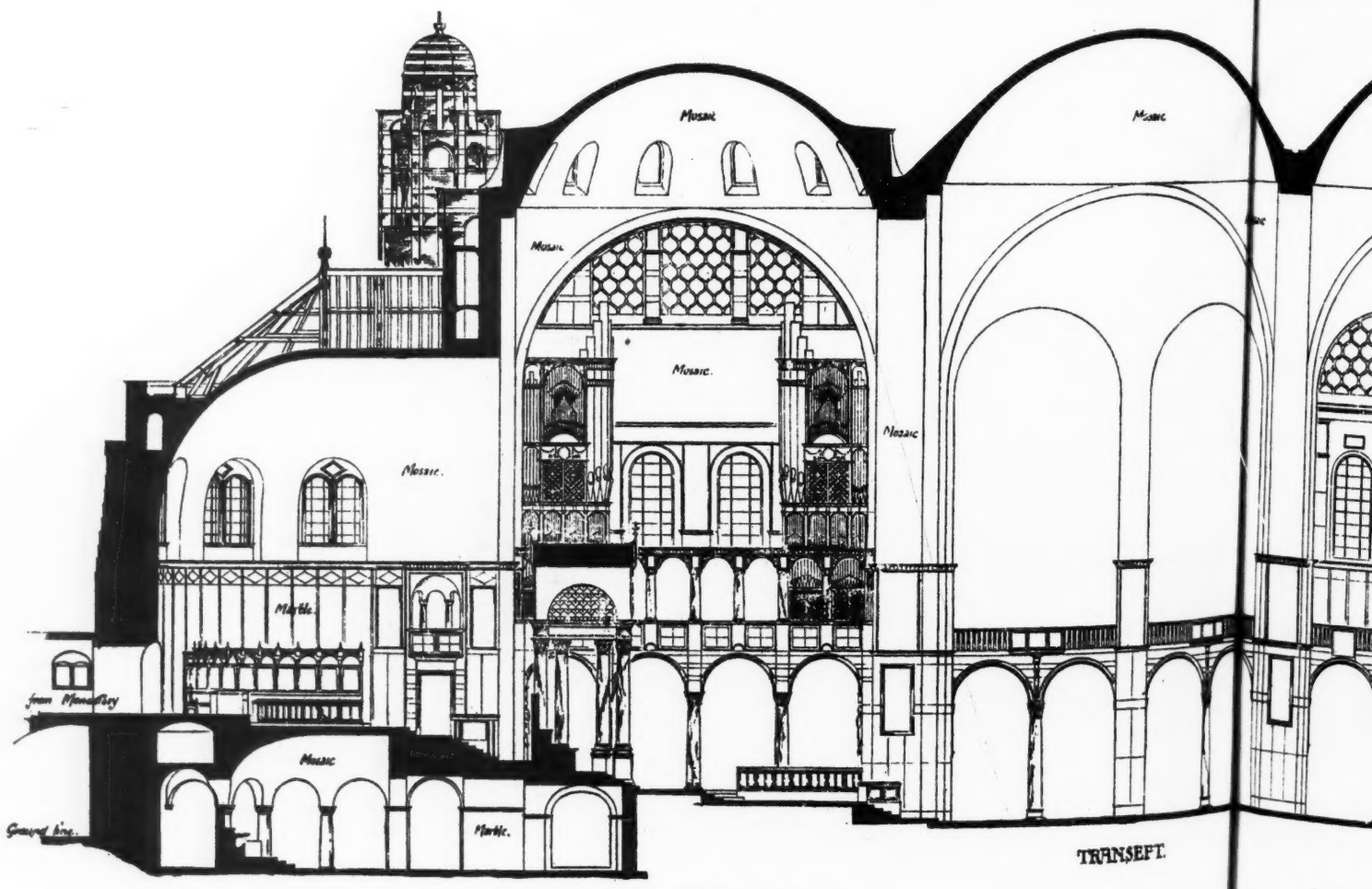
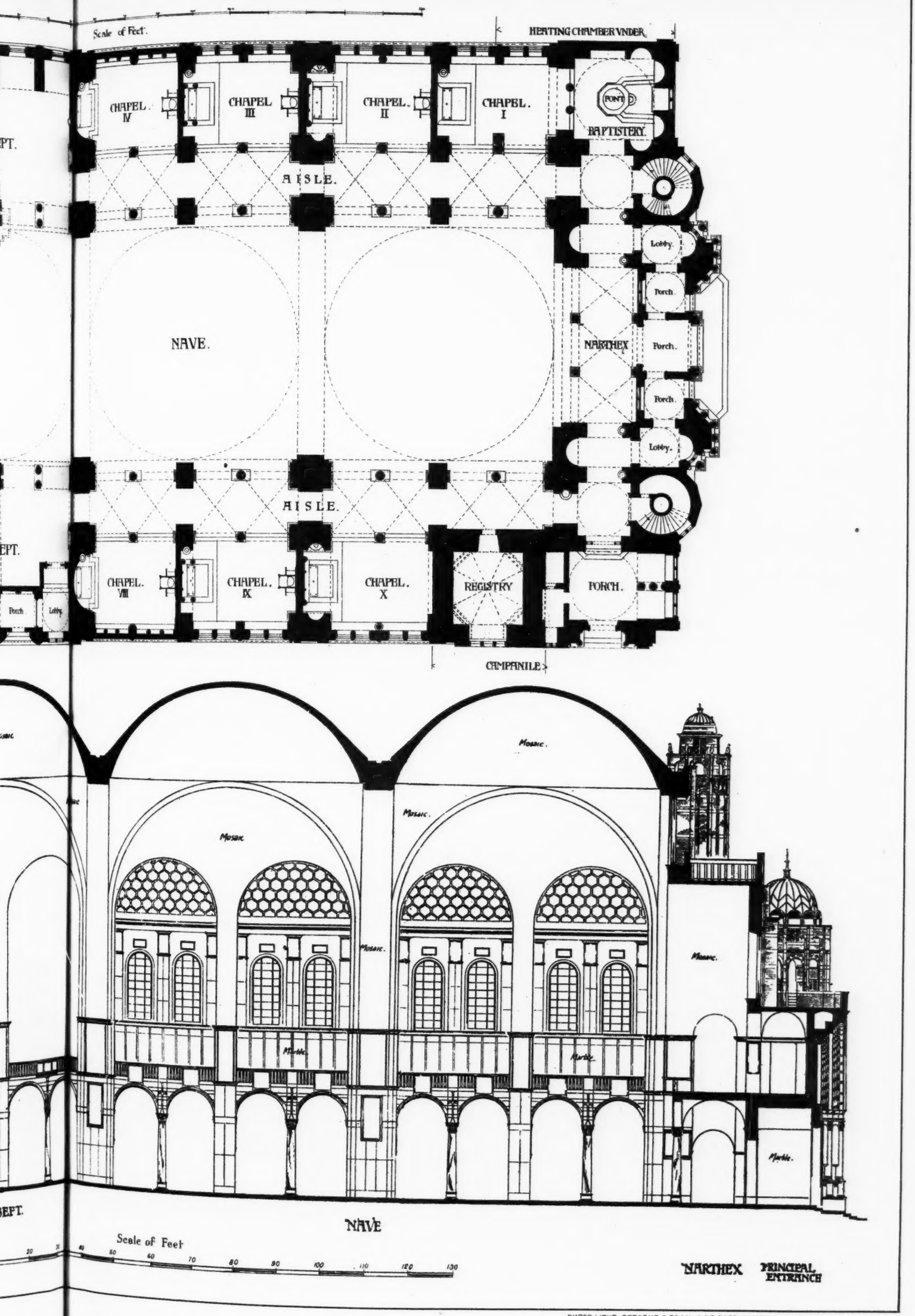




WESTMINSTER CATHEDRAL: PLAN AND SECTION.—THE LATE



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LAN AND SECTION,—THE LATE MR. J. F. BENTLEY, ARCHITECT.